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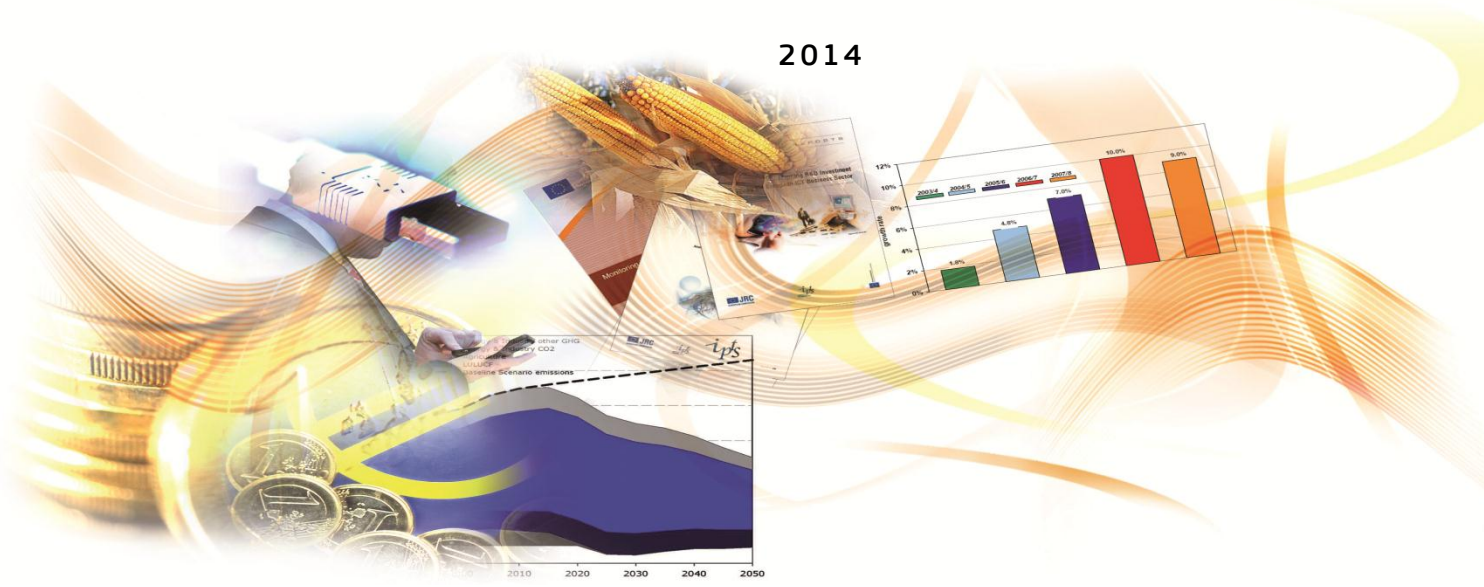

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Abstract

The Analytical Country Reports analyse and assess in a structured manner the evolution of the national policy research and innovation in the perspective of the wider EU strategy and goals, with a particular focus on the performance of the national research and innovation (R&I) system, their broader policy mix and governance. The 2013 edition of the Country Reports highlight national policy and system developments occurring since late 2012 and assess, through dedicated sections:

- national progress in addressing Research and Innovation system challenges;
- national progress in addressing the 5 ERA priorities;
- the progress at Member State level towards achieving the Innovation Union;
- the status and relevant features of Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3);
- as far relevant, country Specific Research and Innovation (R&I) Recommendations.

Detailed annexes in tabular form provide access to country information in a concise and synthetic manner.
The reports were originally produced in December 2013, focusing on policy developments occurring over the preceding twelve months.

ACKNOWLEDGMENTS AND FURTHER INFORMATION

This analytical country report is one of a series of annual ERAWATCH reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). ERAWATCH is a joint initiative of the European Commission's Directorate General for Research and Innovation and Joint Research Centre.
The Country Report 2013 builds on and updates the 2012 edition. The report identifies the structural challenges of the national research and innovation system and assesses the match between the national priorities and the structural challenges, highlighting the latest developments, their dynamics and impact in the overall national context.

The first draft of this report was produced in December 2013 and was focused on developments taking place in the previous twelve months. In particular, it has benefitted from the comments and suggestions of Dimitris KYRIAKOU from JRC-IPTS. The contributions and comments from DG-RTD are also gratefully acknowledged.
The report is currently only published in electronic format and is available on the ERAWATCH website. Comments on this report are welcome and should be addressed to jrc-ipts-erawatch-helpdesk@ec.europa.eu.

EXECUTIVE SUMMARY

The research and technology system of Greece is centralised and dominated by the public sector in terms of both funding and performance. A serious problem in RTDI reporting and evidence-based policy in Greece was until recently the lack of timely data on R&D. At the end of 2013, data on R&D were released for the years 2011 and 2012, but there is a break in series for the period 2006-2010 for research performers and 2008-2010 for research funders. At the end of 2012, GERD was at 0.67% of GDP, only surpassing Bulgaria, Romania, Cyprus and Latvia. The target for 2020 has been revised downwards to 0.67% of GDP[1].

In 2012, GERD decreased to €120.3 per capita (GERD level of 2007), compared to €125.1 per capita in 2011. BERD has increased in the last years, from € 34.3 per capita at the end of 2007 to €43.7 per capita in 2011 but then reduced to €41.2 per capita at the end of 2012, compared to a EU-27 average of €333.6 per capita (2012 data). In the same period, HERD decreased from € 59.1 per capita to €48 per capita at the end of 2012, compared to a EU-27 average of €125.9 per capita[2]. The GERD reduction in 2012 is attributed to fiscal restraint that has resulted to horizontal salary decreases in the public sector, also affecting the salary levels of academics and researchers in public organisations[3].

The year 2013 is characterised by designing interventions for the new programming period. In 2013 the most striking news are:

- The launch of a public consultation of a new law on Research Technology Development and Innovation in Greece in December 2013. The same law proposes the renaming of GSRT to General Secretariat of Research Technology and Innovation and foresees its support by Regional Scientific Councils, introduces new methods for the evaluation of researchers and new funding mechanisms for research programmes;
- The establishment of an Innovation Council in December 2013;
- The enactment of a new law for the establishment of an Investment Fund for financing of regional development mostly of SMEs and the promotion of development and innovation;
- The announcement of NSRF priorities and changes to the funding mechanism in the new programming period.

In 2013 measures were taken to mitigate the liquidity crunch, such as the issuance of a new Law for the financing of SMEs from ETEAN and enactment for a new Investment Fund.

Key Research Performers are universities and public research institutions, accounting together for 59.1% of total GERD (2012 data)4.

Regions have their own research budgets in the current programming period but the majority of their funds are managed by national calls, which have the same content for every region. The selection of proposals is limited by the funds earmarked (ex ante by the NSRF) for each region.

[1] Greek National Reforms Programme 2013, April 2013

[2] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance

[3] Law 4093/2012-Approval of the Medium Term Fiscal Strategy Plan 2013-2016,Urgent implementation measures of L.4046/2012 and the Medium Term Fiscal Strategy Framework 2013-2016 (12.11.2012)

[4] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance

Only few regions with research infrastructure striving for excellence dedicate additional resources to their HEIs, PROs or intermediaries. Smart Specialisation Strategies were devised for all 13 regions.

The Greek Innovation System presents the following challenges:

1. ***The increase of business demand for new knowledge*** to ensure increasing competitiveness and to comply with the economic rationale of RTDI interventions; this challenge is currently addressed through NSRF programmes (Clothing and Footwear-New Perspectives, Internationalisation and Competitiveness of Business, New Innovative Entrepreneurship), while the Greek government has also prioritised extroversion in the next programming period (2014-2020);
2. ***The assurance of better-focused, excellence-based and long-term public funding of R&D*** to exploit national competitive edges and avoid thinly spreading resources; this challenge is particularly important amidst of the current financial crisis. The Greek government intends to concentrate on areas where the country has a comparative advantage;
3. ***The alignment of supply and demand of human resources*** to cope with the current mismatch: insufficient demand of R&D from the private sector and lack of responsiveness of the education system to the market needs. Within this context, Plan "Athena" foresaw streamlining of all HEIs all over the country to achieve economies of scale and adapt skills to the labour market. However, changes as yet were less radical than expected. In the programming period 2014-2020, measures are foreseen for the enhancement of mobility of researchers between research centres and universities and new recruitments of research staff. In March 2014 the Ministry announced a reduction of student posts in HHS by 4% (in addition to 16% last year) to be compensated with a corresponding rise in S&E, which are skills demanded by the market. A legislative act is being drafted by GSRT in 2013 to support networking and increased mobility of researchers, as well as R&D public infrastructures and better allocation of resources. The Ministry of Education and Religion is encouraging the introduction entrepreneurship courses in the university curricula, while GSRT launched a Call for Proposals for the reinforcement of research personnel in enterprises;
4. ***The improvement of the governance of the national innovation system***, which suffers from lack of coordination, limited motivation and de facto absence of studies, evaluations and data to support evidence-based policy to support policy design has been recognised and initiatives are under way, such as the launch of a public consultation for a new law on RTDI and the establishment of an Innovation Council;
5. ***The reduction of regional disparities in R&D and innovation performance*** in order for the regions to concentrate on their local competences is expected through the implementation of the Regional Smart Specialisation Strategies. At the moment only four regions have significant research activities.

Regarding national progress towards Innovation Union Commitments, Greece is characterised by a shortage of researchers, which is aggravated by the reductions that were introduced in their salary levels in 2012. Brain-drain is a very important issue, although the REGPOT programme made the hiring of experienced researchers from all over the world possible, at competitive salaries, and thus resulted to the repatriation of 37 Greek scientists. Improvements in national research infrastructure are under way through the creation of a National Roadmap of Research Infrastructures and ESFRI participation. Access to finance is considered as one of the major bottlenecks for R&D and its commercialisation. Efforts are channelled towards SMEs through ETEAN schemes. There is no explicit public procurement for innovation measures in Greece. An e-platform for tenders became operational in November 2013.

Regarding the ERA pillars, Greece has a high quality research potential but faces significant and increasing brain drain of highly-skilled people. There is not much emphasis on cross-border cooperation. Policies are improving in terms of research infrastructures planning, although the country is still not on track with its European Strategy Forum on Research Infrastructures (ESFRI) roadmap. A major bottleneck for knowledge circulation is the very limited foreign direct investment; conversely Greece is performing quite well in terms of participation of Greek research teams in the Framework Programme (FP). International cooperation is insufficiently developed with few bilateral agreements with no strategy behind them. There is, however, significant potential to tap, and synergies to be pursued, if a persistent and consistent strategy can be developed, benefiting from the assistance of diaspora Greeks who constitute a large network of highly skilled researchers in the USA, in Europe and Australia.

The policy mix is stretching to emulate best practices from the EU but it can hardly improve as long as there is no evidence-based policy conception, assessment and systematic improvement.

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1. BASIC CHARACTERISATION OF THE RESEARCH AND INNOVATION SYSTEM

Greece is a mid-sized country with a total population of 11m people in 2013 corresponding to 2.2% of EU-27 population. It ranks 10th in the EU, after Germany, France, Spain, Italy, United Kingdom, Poland, Romania, the Netherlands and Belgium. Wholesale and retail trade, transport, accommodation and food service activities account for 23.3% of Gross Value Added (GVA) at basic prices, followed by public administration, defence, education, human health and social work activities (20.8% of GVA). Real estate activities account for 16.7% of GVA, industry (except construction) accounts for 14.3% of GVA and manufacturing accounts for 9.7% of GVA[5].

At the end of 2012, GDP per capita was at €17,200, 67.2% of EU-27 average, and has been experiencing a steady decrease from €20,500 in 2009, to €19,600 in 2010 and €18,500 in 2011. Greece presented above EU-average growth before the crisis (2007), but has suffered a heavy uninterrupted recession since 2008; GDP contracted by 6.4% in 2012 and is expected to decrease by 4.0% in 2013 before a projected recovery of 0.6% in 2014[6].

A serious problem in RTDI reporting and evidence-based policy in Greece was until recently the lack of timely data on R&D. At the end of 2013 data on R&D were released for the years 2011 and 2012, but there is a break in series for the period 2006-2010 for research performers and 2008-2010 for research funders. At the end of 2012, GERD was at 0.67% of GDP, only surpassing Bulgaria, Romania, Cyprus and Latvia. The target for 2020 has been revised to 0.67% of GDP[7].

The research and technology system of Greece is centralised and dominated by the public sector in terms of funding. Research funding earmarked by the Structural Funds for the regions is to a large extent managed by central calls, which are the same for the whole territory using regional funding quotas.

The major players in the research and innovation policymaking are the General Secretariat of Research and Technology (GSRT), a policy design and implementation agency, the National Council of Research and Technology (NCRT) and the National Documentation Centre (NDC).

NCRT is the supreme state body for the formulation and implementation of the national policy for research, technology and innovation. NCRT proposes the main R&D guidelines in the area of research and technology, assesses candidacies for directorship appointments in national research organisations, opines to the Ministry of Education and Religion on the composition of electorships for the selection of directors in national research organisations, as well as on any other issue raised by the Ministry of Education and Religion. The GSRT is the main research policy maker and funder of research, currently under the auspices of the Ministry of Education and Religion. The Ministry of Development and Competitiveness is currently managing the National Strategic Reference Framework (NSRF), which is the main funding source for research

[5] Eurostat, Gross Value Added at basic prices
[6] Eurostat, GDP
[7] Greek National Reforms Programme 2013, April 2013

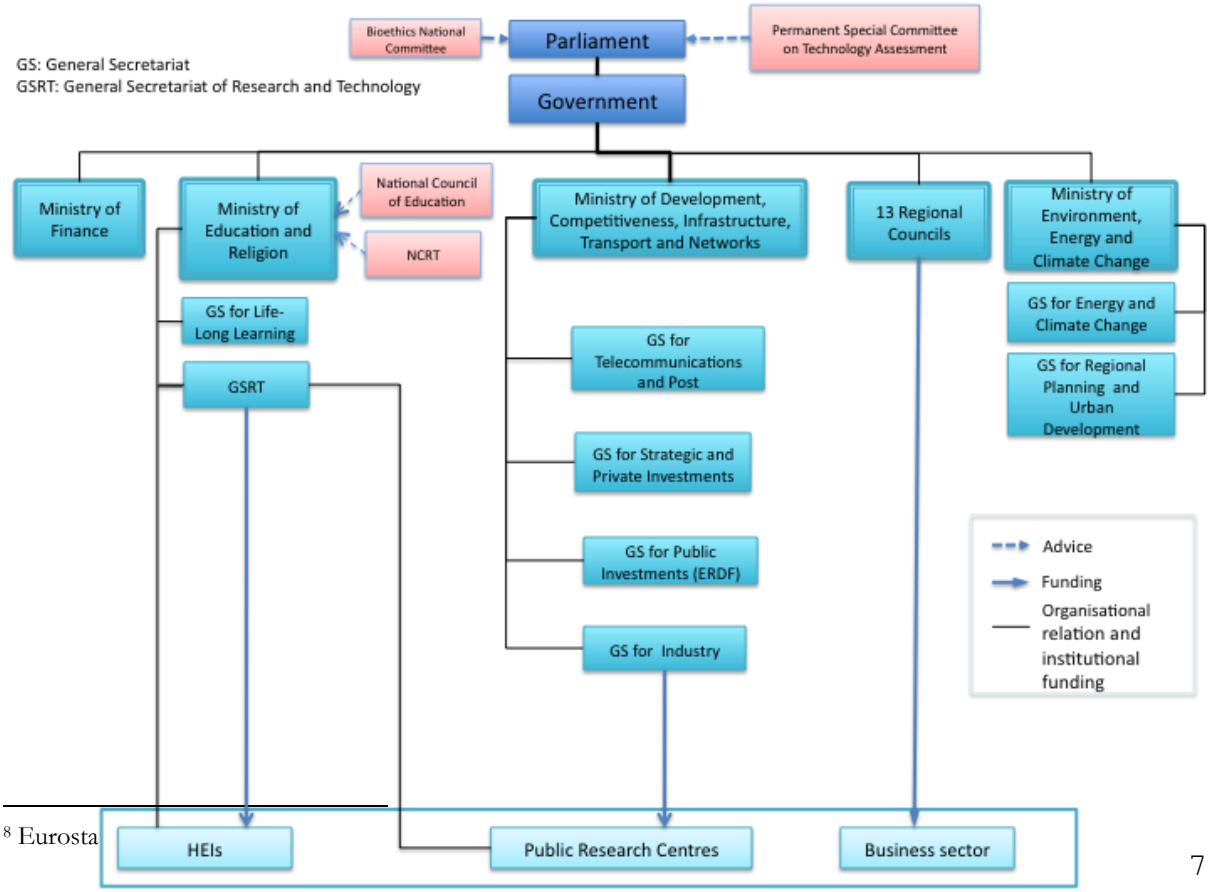
and innovation. Funding coming from the Regional Operational Programmes is typically under the responsibility of the Regional Councils. Responsibility of funding of research is divided between the Ministry of Education and Religion and the Ministry of Development and Competitiveness, having the overall responsibility for supporting regional development in general, including entrepreneurship and partly (recently) innovation.

NDC has evolved today to the national organisation for the documentation, information and support in the areas of research, science and technology.

The Ministry of Development and Competitiveness is currently devising measures to support innovation policy. The General Secretariat of Industry and the General Secretariat of Investments promote measures of this kind. The General Secretariat of Industry is responsible for securing funds from the public investment programme. The General Secretariat of Investments designs measures for the restructuring and development of the country to be financed by the Structural Funds and coordinates regional policies. In this context, there are increasing efforts to include innovation both for targets and evaluation criteria of the new state aid schemes. Key Research Performers are universities and public research institutions, accounting together for 59.1% of total GERD (2012 data)[8].

Research and innovation policy is planned for a period of seven years following the cycle of the Structural Funds' programming periods. Until the previous programming period 2000-2006, research priorities were part of CSF and the majority of the relevant measures were incorporated in the Operational Programme (OP) Competitiveness. In the current programming period 2007-2013, research and innovation policy is described in the Strategic Development Plan for RTI under the 2007-2013 NSFR, which in May 2011 was replaced by a new document "On-line with the future" published by the Ministry of Education and Religion.

Figure 1: Overview of the Greek RTDI system governance structure



[8] Eurosta

In December 2013, a public consultation began for a new law on Research, Technology and Innovation. The law defines the bodies that will be responsible for the design of the new RTDI strategy and establishes a new department within the Ministry of Education and Religion for the design and monitoring of actions related to the national RTDI strategy and its implementation and coordination. This will be organised through the appointment of a person or unit in each Ministry that has RTDI activities. The same law proposes the renaming of GSRT to General Secretariat of Research Technology and Innovation and foresees its support by Regional Scientific Councils, introduces new methods for the evaluation of researchers and new funding mechanisms for research programmes[9].

[9] http://www.opengov.gr/ypepth/?p=1801

2. RECENT DEVELOPMENTS OF THE RESEARCH AND INNOVATION POLICY AND SYSTEM

2.1 National economic and political context

In 2013 there was more political stability after 2012, when Greece was characterised by political uncertainty caused by two successive elections, which provoked an almost standstill of government activities for about 4 months. The research and innovation system was no exception and was affected by delays and changes in governance (GSRT moving back and forth between the Ministry of Development and Competiveness to the Ministry of Education and Religion). In 2013 there was a stabilisation at the political front (despite a change in the government coalition shaped since June by two instead of three political parties) but the financial crisis continued with wage cuts and rising unemployment. At the end of 2012 the unemployment rate was at 24.3% in Greece, compared to 11.4% in EU-17 and 10.5% in EU-27[10]. Unemployment further increased in the first nine months of 2013 to 27.4%[11]. Unemployment is projected to decrease to 25.7% at the end of 2014[12].

In 2012, GERD decreased to €120.3 per capita (GERD level of 2007), compared to €125.1 per capita in 2011. BERD has increased in the last years, from € 34.3 per capita at the end of 2007 to €43.7 per capita in 2011 and €41.2 per capita at the end of 2012, compared to a EU-27 average of €333.6 per capita (2012 data). In the same period, HERD per capita decreased from € 59.1 per capita to €48 per capita at the end of 2012, compared to a EU-27 average of €125.9 per capita[13].

GERD reduction in 2012 is attributed to fiscal restraint that has resulted to horizontal salary decreases in the public sector, also affecting the salary levels of academics and researchers in public organisations[14].

A positive sign for RTDI policy is the decision to systematically gather statistics. Following amendments to the operation of the Hellenic Statistical Authority15, coupled with a Ministerial Decision for the provision of R&D metrics in the period 2008-201316, GERD and BERD are now regularly published and data is available for 2011 and 2012 (but not 2008-2010).

The Greek National Reform Programme has announced measures in the new programming period 2014-2020 for:

- Stimulating R&D investments of the private sector in sectors where the country has a comparative advantage (according to national/regional Smart Specialization Strategies).
- Creating new enterprises with a research orientation.

[10] Eurostat, Unemployment rate by sex and age groups - annual average
[11] Eurostat, Harmonised unemployment rate by sex
[12] European Commission, European Economic Forecast, EUROPEAN ECONOMY 1|2013, Economic and Financial Affairs, Winter 2013
[13] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance
[14] Law 4093/2012-Approval of the Medium Term Fiscal Strategy Plan 2013-2016,Urgent implementation measures of L.4046/2012 and the Medium Term Fiscal Strategy Framework 2013-2016 (12.11.2012)
[15] L.4072/2012-Improvement of the business environment-New corporate entity-Trademarks-Property Brokers-Regulation of matters related to shipping, ports, fishery and other provisions (11.04.2012)
[16] Ministerial Decision 4460/25.04.2012 of the Minister of Education, Religion, Culture and Sports

- Drafting new financial instruments for R&D and innovation[17].

2.2 Funding trends

2.2.1. Funding flows

At the end of 2012, total GERD was at €1,337.6m, marking a decrease of 3.8% compared to 2011. The national target for R&D expenditures as a percentage of GDP has been set at 0.67% by the year 2020. At the end of 2012, GERD was at 0.69% of GDP (€120.3 per capita), compared to EU-27 average of €525.8 per capita[18]. It has been announced that GERD will increase from 0.67% to 0.90%of GDP[19].

Government budget appropriations for R&D (GBAORD) have been fluctuating in the period 2009-2012 in the area of € 580m, starting from a high € 750.7m in 2009. At the end of 2012, GBAORD was at €581.4m, compared to €572.8m at the end of 2011 (1.5% decrease)[20].

In the period 2011-2012, R&D performance shifted from HEI to the government, although the shift was marginal. It is worth observing that total GERD performed by the government remained almost stable in the period 2011 and 2012 at about €331.8m, although GERD performed by HEI and Business Enterprise Sector (BES) decreased by almost 5% in the same period. In total, HEI and the government accounted for almost 65% of total GERD at the end of 2012[21].

Based on latest available statistics (2011), Attica accounts for 55.7% (€775.2m) of total GERD, followed by Central Macedonia (€ 190.3m) and Crete (€ 106.1m)[22].

Government funded 50.4% of total GERD in 2012, followed by the Business Enterprise sector (31% of total GERD). Most of government funding in 2012 was directed to the Higher Education sector (€377.3m) and to public research organisations (€257.3m). Funding from the BES was at € 414.8m at the end of 2012, compared to € 455.5m at the end of 2011 (8.9% decrease). In the same period, funding from HEI decreased by 17%.[23] In terms of foreign funds, the main source of foreign funding comes from the European Union.

Greece ranked first in number of projects funded by the Research Potential for Convergence Regions (REGPOT) programme in the period 2007-2012[24]. REGPOT programme has financed a total of € 56m, the majority of which in Health and Natural Sciences; about 46% has been absorbed from Attika region, 30.2% from Crete, 9.4% from Central Macedonia, 7.6% from Western Greece, 4.2% from East Macedonia and Thrace and 1.9% from Ipeiros[25].

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[17] Greek National Reforms Programme 2013, April 2013
[18] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance
[19] New NSRF, (2014-2020), Priorities and Architecture, Ministry of Development and Competitiveness, December 9th 2013

[20] Eurostat, Total GBAORD by NABS 2007 socio-economic objectives
[21] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance
[22] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance and NUTS 2 regions
[23] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance and sources of funds
[24] Tzenou G, Malliou N., Sahini E., Academic Excellence in EU Convergence areas 2007-2012: the case of Greece, National Documentation Centre (in Greek)
[25] Tzenou G, Malliou N., Sahini E., Academic Excellence in EU Convergence areas 2007-2012: the case of Greece, National Documentation Centre (in Greek)

Table 1. Basic indicators for R&D investments*

	2009	2010	2011	2012	EU (2012) **
GDP growth rate	-3,10	-4,90	-7,10	-6,40	
GERD (% of GDP)	n/a	n/a	0.67	0.69	
GERD (euro per capita)	n/a	n/a	125.1	120.3	
GBAORD - Total R&D appropriations (€ million)	750.7	595.9	572.8	581.4	
R&D funded by Business Enterprise Sector (% of GDP)	n/a	n/a	0.22	0.21	
R&D performed by HEIs (% of GERD)	n/a	n/a	40,2%	39,9%	
R&D performed by Government Sector (% of GERD)	n/a	n/a	23,8%	24,8%	
R&D performed by Business Enterprise Sector (% of GERD)	n/a	n/a	34,9%	34,3%	
Share of competitive vs. institutional public funding for R&D	n/a	n/a	n/a	n/a	
Venture Capital as % of GDP (Eurostat table code tin00141)	0.017	0.007	0.004	0.0	
Employment in high- and medium-high-technology manufacturing sectors as share of total employment (Eurostat table code tin00141)	1.5	1.4	1.4	1.3	
Employment in knowledge-intensive service sectors as share of total employment (Eurostat table code tsc00012)	32.7	33.3	34.6	36.3	

p: provisional data
Source: Eurostat, mid December 2013
* The 2012 data will be added once the December 2013 data will be released
**The EU27 (or 28 as far available) average data will be provided by IPTS in December 2013.

Greece, as pointed out, is suffering from insufficient data on innovation as there has been no CIS in 2010 or later. The only data available are from Eurostat in 2006, which suggests a very sharp increase from 2004 to 2006.

	2004	2006	2008
Turnover from Innovation as % of total turnover (Eurostat table code tsdec340)	11.0	25.7	n/a

However, the general perception is that the crisis has diminished liquidity and this has affected innovation as well as overall business expenditure.

2.2.2. Funding mechanisms

2.2.2.1. Competitive vs. institutional public funding

The largest part of R&D public funding is channelled to universities and research centres in the form of block grants. Until 2009 the most important budgetary sources were the Ministries of Education and Religion and the Ministry of Development and Competitiveness, which monitored the operation of the GSRT. After the move of GSRT to the Ministry of Education and Religion the latter has become the only important source of funding. Overall institutional

funding represented 0.56% of GBAORD in 2012, almost 40% of EU-27 average and has remained almost stable in the period 2009-2012[26].

Direct funding to universities through the general university funds (GUFs), represented over 70% of HERD in 2012 (€377.3m), compared to 69.6% in 2011. The only channel for competitive funding for the current programming period 2007-2013 is the NSRF, which is co-financed by the Structural Funds; 'Bottom-up' -'free-funding' projects refers to funding of individual researchers or research teams, on the basis of their scientific excellence within the context of all year around open competition, is not provided for in Greece.

Although there are no detailed data available, the general perception is that institutional funding is significantly higher than competitive funding. Similarly, the limited institutional evaluations are not affecting resource allocation. By and large, the system is characterised more by inertia than dynamism and change in view of supporting excellence.

2.2.2.2. Government direct vs. indirect R&D funding[27]

The recent financial crisis and the shortage of capital have minimised indirect R&D funding and financing from venture capital (venture capital as % of GDP was equal practically to zero in 2012); The Innovation Fund, established since June 2012 by the Ministry of Education and Religion and the Ministry of Development and Competitiveness with a total capital of €30m, did not manage to kick off.

In 2014, new measures are foreseen for the support of research and innovation activities, based on the results of the study financed by the General Secretariat of Research and Technology "Proposals to remove obstacles to the commercial exploitation of firm's innovation" (completed in 2012)[28]. The Smart Specialisation Study (RIS3) will also be used as input for the next programming period.

The new tax law (voted in December 2013) provides for tax exemptions for R&D expenditure[29].

2.2.3. Thematic versus generic funding

Culture, recreation, religion and mass media and general advancement of knowledge (R&D financed from General University Funds -GUF- and other sources) accounted for over 70% of total GBAORD in 2011 and in 2012. Grand challenges (Energy, Health and Environment) accounted for about 8% of GBAORD in the same period (Table Annex 4).

In scientific publications, Greece contributes the most in the areas of construction, ICT, security, aeronautics and space, transport, production and energy. Technology specialisation lies in food and agriculture, space, construction, aeronautics and environment[30].

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[26] Eurostat, Total GBAORD as a % of total general government expenditure

[27] ***Government direct R&D funding*** includes grants, loans and procurement. *Government indirect R&D funding* includes tax incentives such as R&D tax credits, R&D allowances, reductions in R&D workers' wage taxes and social security contributions, and accelerated depreciation of R&D capital.

[28] Greek National Reforms Programme, April 2013, Ministry of Finance

[29] http://www.hellenicparliament.gr/UserFiles/bcc26661-143b-4f2d-8916-0e0e66ba4c50/e-enfia-pap.pdf

[30] European Commission, DG for Research and Innovation, Research and Innovation performance in Greece Country Profile 2013

The Ministry of Development and Competitiveness identified priority areas for the new programming period 2014-2020[31]:

- Tourism
- Agricultural sector
- Logistics
- Environmental industry
- Health
- Energy production and savings, materials
- ICT
- Creative industries and culture

2.2.4. Innovation funding

There are neither explicit data nor there is a distinction of innovation funding.

All responsibilities for planning and funding innovation at the national level are funded by the Operational Programme "Competitiveness and Entrepreneurship"; smaller schemes are supported at the regional level with funds earmarked in the Regional Operational Programmes, which are managed by the Regional Councils but to a large extent coordinated nationally. A shift towards innovation is expressed in the new development-oriented strategy, as Greece exits slowly the crisis, but concrete evidence is scarce.

Funding of innovation activities has traditionally been of two kinds:

1. Measures including both R&D and Innovation (e.g. Collaboration; Clusters), where the innovation component is difficult to distinguish
2. Measures supporting investments, where innovation is incorporated in new equipment; again there is no accounting distinguishing the innovative component of new investments. In February 2011, a new investment law 3908/11 entered into force. The new law provides for fiscal and tax incentives of various categories of expenditure, among which R&D and innovation programmes implemented by enterprises in collaboration with Higher Education Institutions from Greece or the EU. Fiscal incentives include tax allowances for 10 years for newly established companies or 8 years for all other companies and grants for lease payments for the acquisition of new infrastructure and for a maximum period of 7 years. The maximum level of the contribution depends on the area in which the specific programme takes place and the size of the company implementing it. It can reach up to 50% for very small companies in less developed regions (North and South Aegean islands, Ipeiros, Western Greece, Eastern Macedonia and Thrace etc.).

Purely innovation measures include:

- The Innovation Voucher Scheme of the country: From September 2009 up till 2012, 286 projects have been approved. In these projects there are also research component included.
- Support to innovative companies through matching private venture capital funds. Three new funds were financed by JEREMIE;
    - The Openfund was established in 2008 by 7 investors with an initial capital of €500,000 to provide pre-seed and seed financing to technology companies. Investment tickets were €20,000-€50,000 for a 15% equity stake. The fund has recently raised supplementary financing of €10m, principally from the European Investment Fund and 11 private investors. Investment tickets are

[31] http://www.mindev.gov.gr/?p=13302

now between €20,000-€30,000 with a 20% equity stake. In the next three years, the fund aims to partner with up to 25 pre-seed and 10 seed stage companies and to pull around 50 mentors to join the fund and assist entrepreneurs.

- The Odyssey JEREMIE Partners fund is the largest venture capital fund in Greece, exclusively focused on ICT investments.
- PJ Tech Calalyst is a fund established by Pireaus Bank to provide seed financing to ICT companies.

In addition in July 2013 a MOU was signed between the Ministry of Development and Competitiveness and the German bank KfW for the creation of new Investment Fund by the end of 2013, which will finance regional development mostly of SMEs and promote development and innovation. The Greek government will contribute € 350 m to the Fund (€ 200 m from NSRF and € 150 m from public investment programme, KfW will contribute € 100 m). In December 2013, the Greek Parliament voted the law for the establishment of this Fund. Onassis Foundation has also agreed to contribute €30m to the Fund .An Institution for Growth (IfG) was established, dedicated to the support of innovation, and growth of SMEs.

National policies are increasingly focusing on innovation using schemes like innovation vouchers, clusters etc. There are no formal evaluations reporting on the outcome of these measures but the overall impression is that the innovative performance is suffering from the overall macroeconomic instability. Using the data of the Global Competitiveness Report 2014 it is clear that, although Greece is positioned (together with most Member States) in the "Innovation-driven: economies group, its performance is well behind its peers and occasionally behind countries in transition groups and efficiency-driven ones: The country ranks 81st in Innovation and Sophistication Factors and 87th in Innovation, with a score below India, Gambia, Ghana, the Philippines and other developing countries.

For the next programming period the Ministry of Development and Competitiveness is currently devising measures to support innovation policy. The General Secretariat of Industry and the General Secretariat of Investments envisage such measures. However, no precise budgets or support measures have been announced as yet.

2.3. Research and Innovation system changes

No major changes took place at the level of governance. The Ministry of Development, Competitiveness, Infrastructure and Transport was split; its major part the new Ministry of Competitiveness and Development, responsible i.a. for the Structural Funds, has a major role to play in entrepreneurship and innovation policy.
The role of the GSRT will be enhanced through the implementation of innovation initiatives following the voting of the new law on Research, Technology and Innovation; its name will change to General Secretariat of Technology and Innovation and will be responsible for the support of research organisations and the industry in the implementation of thematic clusters of advanced research, the development of knowledge and innovation communities, the collaboration between academics and the industry and the establishment of research laboratories[32].
In December 2013, the establishment of Innovation Council was announced, with the joint participation of academics and the business sector[33].

[32] http://www.opengov.gr/ypepth/?p=1793
[33] http://www.mindev.gov.gr/?p=13184

2.4. Recent Policy developments

An important law for the restructuring of the research system was issued in February 2012. The new Law addressed problems associated with the diversity of research priorities pursued by different research organisations in Greece, the inability of members of research centres to access the infrastructure of other research centres, the limited cooperation between research teams in Greece and the existence of research organisations with a very small number of researchers (more than 20 organisations operated with less than 5 researchers). Mergers of research organisations were foreseen by this law in an effort to enhance scientific cooperation and synergies, create a critical mass of researchers and rationalise administrative and operational costs[34].

The NDC was assigned by Ministerial decision 4460/25.04.2012 to regularly produce R&D metrics for the period 2008-2013. R&D metrics for the period 2011-2012 were released in October 2013.

In November 2012, Law 4093/2012-Approval of the Medium Term Fiscal Strategy Plan 2013-2016, Urgent implementation measures of L.4046/2012 and the Medium Term Fiscal Strategy Framework 2013-2016 (12.11.2012) was issued, introducing salary cuts to the salaries of researchers and special scientists employed by local research organisations.

Plan "Athena", which foresees shutting down and mergers of HEIs all over the country to achieve economies of scale and adapt skills to the labour market, went live in 2013 with restructuring in Technical Educational Institutes and the establishment of new departments in National and Kapodistrian University of Athens and Democritus University of Thrace[35]. More changes may be introduced by Presidential Decrees. However, this is unlikely to happen in the near future, as HEIs are in a serious turmoil, following the decision of the government to reduce their administrative personnel, in the context of reducing the public sector employment (and budget deficit). The academic year started in December 2013 in one of the largest HEIs in Greece, the National and Kapodistrian University of Athens.

In December 2013, the Minister of Development and Competitiveness presented the NSRF for the new programming period 2014-2020, with a total budget of €20.8b, about 14.5% less than the NSRF of the previous programming period, however an additional €2b is expected to be included into the programme after the revision in 2016. The proposed NSRF allocates 65% of its budget to 4 OPs, Competitiveness, Entrepreneurship and Innovation, Transport, Environment and Sustainable Development, Human Resources, Training and Lifelong learning and OP for the Restructuring of the Public Sector, and 35% to 13 ROPs. The latter will also receive funding from the European Social Fund. Expenditure on Innovation is expected to account for 8% of total budget. Changes are also proposed in the governance of the funding mechanism with the establishment of dedicated units within each Ministry for better coordination between the beneficiaries and the Managing Authorities. The proposed NSRF is expected to have been approved by the EC by March 2013[36].

[34] , Law 4051/2012-Pension reforms and other urgent measures for the implementation of Memorandum of Understanding (introduced by Law 4046/2012 on 29.02.2012)

[35] http://www.esos.gr/uploads/axiologisi/proedrika-diatagmata-sxedio-athina-tei-hpeiroy-panepistimia-athinon-thrakis.pdf

[36] http://www.mindev.gov.gr/?p=13166

In terms of consultations, a public consultation for a new Law on Research, Technology Development and Innovation was launched in December 2013.

2.5. National Reform Programme 2013 and R&I

The financial crisis that Greece experiences for five years has resulted into severe cuts in research funding, a decrease of private sector R&D investments and a cut down on recruitments in public research centres and universities. This reality combined with the ageing of the human research potential and the on-going emigration of young scientists (brain-drain) lead to a revision of the national target for R&D expenditures to reach 0.67% of GDP by the year 2020, down from 2% of GDP that was initially envisaged. This despite the contraction of GDP by a quarter during the crisis.

In the research sector, efforts focused on the support of young researchers and the enhancement of R&D potential through specific NRSF programmes (Excellence II). However, additional measures are needed in order to increase the number of researchers and address brain-drain.

Research choices of public research organisations and the Greek Atomic Energy Commission, both supervised by GSRT, were enhanced through the implementation of NSRF action "Proposals for the Development of the Research Centres-KRIPIS".

The drafting of a national roadmap for research infrastructures is expected. Taking into account that about 70% of GERD is performed by the public sector policies aiming at strengthening public research organisations are likely to have an important influence on the enhancement of R&D.

Several actions were launched for the enhancement of innovation, including the "Creation of Innovation Clusters "A GREEK PRODUCT, A SINGLE MARKET: THE PLANET" and a programme for "Supporting enterprises for recruiting research personnel". PAVET 2013 is under preparation, with emphasis on specific thematic priorities namely Agriculture, Food, ICT, Pharmaceuticals, Environment, etc. and a total budget of € 30 million. Collaboration between enterprises and research organisations is encouraged.

The programme "New-Innovative Entrepreneurship" entered payments phase in late 2012 and early 2013. Total certified proposals amount to 439, with a total budget of € 63.1 million, about 60% of which is public subsidy. The programme intends to improve innovation policy and design for entrepreneurs and SMEs and support the commercialisation of new knowledge and ideas. A second call for proposals is expected in the second semester of 2013 for youth entrepreneurship.

In July 2013, the Ministry of Development and Competitiveness signed an MOU with the German bank KfW Kreditanstalt fűr Wiederaufbau) for the establishment of an Investment Fund by the end of 2013 which will finance regional development mostly of SMEs and promote development and innovation. The Greek government will contribute € 350 m to the Fund (€ 200 m from NSRF and € 150 m from public investment programme, KfW will contribute € 100 m)[37]. In December 2013, the Greek Parliament voted the law for the establishment of this Fund[38]. Onassis Foundation has also agreed to contribute €30m to the Fund[39].

[37] http://www.mindev.gov.gr/?p=11596
[38] http://www.hellenicparliament.gr/UserFiles/bcc26661-143b-4f2d-8916-0e0e66ba4c50/k-axiop-pap.pdf
[39] http://www.mindev.gov.gr/?p=12897

2.6. Recent evaluations, consultations, foresight exercises

There is no recent analysis of strengths and weaknesses of Greece at national level or of emerging opportunities ("smart specialisation) and market developments to research and innovation policies in 2012-2013, except for the European Commission, European Public Sector Innovation Scoreboard, A pilot exercise 2013 which covered the period 2003-2012 and ranked Greece above average in innovative services and innovative procurement.
The last evaluation of Public Research Organisations took place in 2005. The next was planned for 2010 but was delayed and started late in 2013, expected to be completed in the first quarter of 2014.

2.7. Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)

Regional Strategies for RTDI are included in the Regional Operational Programmes for 2007-2013. The eight Convergence Regions are also benefitting from national funds for institutional funding. These strategies have been mostly uniform and managed by national calls and regional budgetary quotas. Only in few regions do regional authorities support local research organisations and HEIs from the regional budget.

In September 2012 the GSRT has published its proposal for the orientation of RTDI in the context of the national development plan. The National RIS3 sets up priorities in areas where Greece has traditionally a competitive advantage, namely agriculture and food production, ICT for manufacturing and services, health services, biomedical and pharmaceuticals, and energy and chemicals. At a regional level, it is proposed that a process of "entrepreneurial discovery" is implemented[40].

Regional Smart Specialisation Strategies for 13 regions were prepared by a team of international and Greek experts in the context of RIS3, taking into account a comprehensive analysis of the regional innovation landscape (SWOT analysis). The following priorities were identified by region:

- Attica: transport systems (maritime and urban), creative industries, knowledge intensive business services; (green) ICT as a key enabling technology for efficiency improvements in the private and public sectors, eco-innovation for the enhancement of urban environment[41];
- Central Macedonia: eco-innovation across manufacturing, agricultural and service (green ICT and tourism) sectors, and specific innovation actions to improve efficiency through e-government, public-private partnerships for service delivery[42];
- Eastern Macedonia and Thrace: stronger innovation policy integrating the ideas of smart specialisation, identification of niche markets both in domestic and export markets,

[40] RIS3 National Assessment: Greece, Smart specialisation as a means to foster economic renewal, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, Reid A., Komninos N., Sanchez J., Tsanakas P.
[41] RIS3 Assessment: Attica, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.
[42] RIS3 Assessment: Central Macedonia, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

manufacturing and the regeneration of the industrial tissue of the region, enhancement of the competitiveness of SMEs[43];

- Western Macedonia: adoption of a more diversified approach building on existing clusters of business activity and shifting from energy into higher-value added activities with a strong focus on exports[44];
- Crete: agro-food sector (production, packaging, food processing, Mediterranean diet), the cultural-tourist sector (hospitality, travel agencies, cultural capital, cultural activities), and the technological educational sector (research centres, universities, technology park) and its connection to the other two sectors, reduction of the dual economy, with a split between low technology agricultural and tourism activities and high technology research and education and a few spin-off firms[45];
- Ionian islands: bio-economy, both on natural resources and biodiversity (with a potential for reinvigorating the agricultural sector through the production of new crops and a focus on designated origin, etc. products) as well as aquatic resources (blue-biotech) [46];
- Epirus: RTDI investment on R&D for the dairy industry and other agro-food firms, ICT in regional health and tourism services and manufacturing production and, technology know-how related to environmental protection and sustainable exploitation of the natural biodiversity[47];
- Peloponnese: cluster programmes for agro-food, tourism and manufacturing sectors and cross-sectoral support for technological upgrading of business sectors[48];
- North Aegean: bio-economy, branding based on natural environment[49];
- South Aegean: cross-sectoral technology upgrading and adaptation of production processes to reduce energy use, reduce material input and waste generated, higher value products and services related to tourism[50];
- Sterea Ellas: modernisation of the agro-food sector, promotion of environmental and energy saving technologies and ICT, cross-sectoral opportunities for applying other key enabling technologies, notably ICT[51];
- Thessalia: cross-sectoral opportunities for applying other key enabling technologies, notably ICT, strengthening the access of regional firms to knowledge intensive business services, focus on metal production and construction materials along with agro-food sector and related industries[52];

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[43] RIS3 Assessment: East Macedonia and Thrace, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[44] RIS3 Assessment: Dytiki Makedonia, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[45] RIS3 Assessment: Crete, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[46] RIS3 Assessment: Ionian islands, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[47] RIS3 Assessment: Epirus, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[48] RIS3 Assessment: Peloponnese, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[49] RIS3 Assessment: North Aegean, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[50] RIS3 Assessment: South Aegean, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[51] RIS3 Assessment: Central Greece, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

[52] RIS3 Assessment: Thessaly, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.

- Western Greece: bio-economy[53].

Regional peer review workshops were organised, aiming at presenting the work on RIS3 and discuss the strategies with regional stakeholders.

In terms of financial instruments, it is proposed that a mixture of contracting out of programme management and public-private-partnerships (PPP) for future programmes is implemented.

Monitoring and evaluation of RIS3 is envisaged to be taken up by GSRT and the regional authorities.

2.8. Policy developments related to Council Country Specific Recommendations

In the EU/IMF financial assistance programme for Greece there are no R&I commitments. The review of the second adjustment programme for Greece provided for the establishment of an Institution for Growth (IfG), which will be dedicated to the support of innovation, and growth of SMEs. Funding will come from the Hellenic Republic (up to €350 million in the next three years) and other shareholders, while its Board is intended to have a strong international presence[54].

[53] RIS3 Assessment: Western Greece, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, December 2012 (final version), Reid A., Komninos N., Sanchez J., Tsanakas P.
[54] The Second Economic Adjustment Programme for Greece, Third Review – July 2013, Occasional Papers 159 | July 2013, Economic and Financial Affairs

3. PERFORMANCE OF THE NATIONAL RESEARCH AND INNOVATION SYSTEM

3.1. National Research and Innovation policy

R&D expenditure and funding in Greece is among the lowest in the European Union, accounting for 0.50% of EU-27 (Eurostat, 2012 data). Human Resources in Science and Technology in the age group 25-64 years old are below EU average at 29.2% of total population compared to an EU-27 average of 36.6% of total population[55].

In terms of research output, Greece is on the average of its peer group (Western Europe) for the last 12 years; total scientific publications passed from 6,004 in 2000 (13th position) to 16,829 in 2012 (13th position). Greece recorded 10.11 citations per document in the period 1996-2012. Most of the documents were published in the areas of Medicine, Engineering, Biochemistry, Genetics and Molecular Biology and Computer Science. At the end of 2012, Greece recorded 0.565 cites per document, compared to 0.543 cites per document in Western Europe and 0.304 cites per document in Eastern Europe[56].

In terms of scientific publications, Greece contributes the most in the areas of construction, ICT, security, aeronautics and space, transport, production and energy. Technology specialisation lies in food and agriculture, space, construction, aeronautics and environment. With the exceptions of food, agriculture and fisheries, there is insufficient convergence of S&T leading to a lack of focus is smart specialisation strategies[57].

In a survey conducted by Science-Metrix using DOAJ, PubMedCentral, and Scopus regarding papers published on open access in the period 2008-2011 among EU 27 countries, Greece ranked in the middle with 568 papers (43% of total published papers). In terms of repositories, Greece ranked above average with over 100,000 records contained in institutional repositories[58].

Triadic patents filed by Greek inventors have significantly decreased in the last years from 14.3 in 2006 to 2 in 2008 and zero patents at the end of 2010. There were no triadic patents filed by Greek applicants at the end of 2010 for the fourth consecutive year since 2006. Low BERD and lack of explicit IPR policy in HEIs explains the limited interest in patenting. At the end of 2011, there were 77 patent applications by residents (69th rank), and 404 applications from abroad (42nd rank). In the period 1997-2011, patents concentrated in civil engineering (8.41% of total), pharmaceuticals (7.98% of total) and machine tools (7.38% of total)[59]. PCT patents applications per billion GDP (in PPS€) were at 0.44 in 2009, compared to a EU median of 4[60].

In the period 2007-2013, Greece spent around € 4 billion on innovation, while for the next programming period this is expected to increase to about € 8 billion. There is a large potential

[55] Eurostat, Annual data on HRST and sub-groups, by sex and age
[56] http://www.scimagojr.com/countrysearch.php?country=GR
[57] European Commission, DG for Research and Innovation, Research and Innovation performance in Greece Country Profile 2013
[58] Caruso J., Archambault A. and E., Open Access Strategies in the European Research Area, August 2013 produced for the European Commission DG Research & Innovation
[59] World Intellectual Property Organisation, Greece
[60] Innovation Union Competitiveness Report 2011, Cyprus

for job creation through strengthening R&D, innovation and enhancing cooperation between the public and the private sector[61].

Table 2:

HUMAN RESOURCES	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34[1]	1.05
Percentage population aged 25-64 having completed tertiary education	41.1
Open, excellent and attractive research systems	
International scientific co-publications per million population	
Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	
Finance and support	
R&D expenditure in the public sector as % of GDP	0.17
Public Funding for innovation (innovation vouchers, venture/seed capital, access to finance granted by the public sector to innovative companies)	n/a
FIRM ACTIVITIES	
R&D expenditure in the business sector as % of GDP	0.24
Venture capital and seed capital as % of GDP	0.00
Linkages & entrepreneurship	
Public-private co-publications per million population	
Intellectual assets	
PCT patents applications per billion GDP (in PPS€)[2]	0.44
PCT patents applications in societal challenges per billion GDP (in PPS€) (climate change mitigation; health)[2]	0.13
OUTPUTS	
Economic effects	
Medium and high-tech product exports as % total product exports[3]	3.3
Knowledge-intensive services exports as % total service exports[4]	5.38
License and patent revenues from abroad as % of GDP[3]	0.02

[1] 2011 Data available from Innovation Union Competitiveness Report 2013
[2] 2009 Data available from Innovation Union Competitiveness Report, Greece 2011
[3] Availability of data for High Tech product exports as % of total product exports
[4] 2011 Data available from Innovation Union Scoreboard 2013
Source: Eurostat, Innovation Union Scoreboard 2013

Based on Innovation Union Scoreboard 2013, Greece is a "moderate innovator" but has been performing below average. Innovation performance has declined at an average annual rate of 1.7% in the period 2008-2012, making Greece the only country, along with Cyprus, with a negative innovation performance. Innovation performance has decreased by 6% in the period 2010-2012. Its relative strengths are in Innovators, where the indicators are amongst the highest in EU-27, while its relative weaknesses are in Finance. High growth is observed in the area of Community designs. "SMEs innovating in-house" (31%) and "Innovative SMEs collaborating with others" (81%) are well above the EU-27 average. The expenditure on non-R&D innovation is also impressive (2.96% of the turnover).

[61] European Commission, DG for Research and Innovation, Innovation Union Competitiveness report 2011, Country profile – Greece

A relatively strong decline is observed for Venture capital investments and Knowledge-intensive services exports. However, the activation of Jeremie initiative may change this trend in the future. Growth performance in Open, excellent and attractive research systems and Intellectual assets is well above average[62].

3.2. Structural challenges of the national R&I system

The national innovation system is characterised by lack of business demand for new knowledge and focus of R&D, funding, low demand for researchers, inefficient governance mechanisms and an imbalanced development of innovation priorities at a regional level. These challenges are aggravated by the financial crisis that has shifted focus from R&D to other sectors that could stimulate growth in the economy.

The five structural challenges are analysed below.

Increase business demand for new knowledge

All R&D and innovation performance indicators related to the business sector have remained well below the EU-27 average (European Commission, 2011; Pro Inno Europe, 2011). BERD as a percentage of GDP was at 0.24 at the end of 2012, almost the same compared to 2011 and less than 20% of the EU-27 average (1.3%)[63]. At the end of 2011, innovation output performance was at 83.9 compared to 84.7 at the end of 2011[64].

In the period 1995-2005, there was an increase in the share of BERD by both manufacturing and services, manufacturing representing 56% and services 36% of total BERD[65]. At the end of 2012, the situation was reversed and manufacturing represented 39.2% of BERD while services 57.6% of BERD[66].

The demand for research-based knowledge from the private sector has remained very low even in sectors with relatively high innovation performance; the latter focusing their innovation efforts mainly on non-R&D and non-technological aspects such as marketing and organisational improvements. The low share of manufacturing (just below 10% of GDP), and the financial turmoil that has reduced liquidity and has affected the business sector severely, are both likely to further reduce research-based innovation. The situation is aggravated by the crisis and the reduced liquidity of the banking sector, which has directly affected all businesses. RTDI expenditure is among the first to be reduced.

With limited and reducing demand for R&D a major challenge for public policy is:

- to create a stable macro-economic environment that will trigger investments in technology that need a longer term horizon to amortise and
- to eliminate factors that hamper innovation/entrepreneurship, remove bureaucracy that turns away SMEs and attract ambitious companies minimising crowding out.

[62] Innovation Union Scoreboard 2013
[63] Eurostat, Total intramural R&D expenditure (GERD) by sectors of performance
[64] Innovation Union Competitiveness report 2013, Research and Innovation
[65] Innovation Union Competitiveness Report, Greece 2011
[66] Eurostat, Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 2)

Ensure better-focused and long term public funding of R&D

Among EU-27, Greece ranks 7th in terms of number of applicants to FP7 programmes and 7th in terms of requested EC contribution[67]. Funding from abroad covers about 16% of total R&D and it is principally allocated to HEIs (40.8% of total) and BES (31.4% of total).

As the design and management of the Structural Funds is complex and the management capacity of the Greek administration is limited, the dependence on Structural Funds has resulted to fragmented planning and budgets being allocated to various sectoral and regional Operational Programmes. In addition, absorption rather than impact is in general the dominant funding criterion. This leads to a vicious circle between chasing funds and neglecting priorities. For years the lack of priorities and the scarcity of public funding have created an opportunistic supply driven research system (Bartzokas, 2007). This system often followed the priorities of the EU Framework Programmes (Grant et al, 2011), which were not always related to the needs of the country. Even worse, lack of focus hindered the creation of economies of scale of national relevance and importance in research areas (Grant et al, 2011).

The current debt crisis and the severe budget cuts increase the importance of consolidated and targeted funding towards few and well-defined priority areas.

Align supply and demand of human resources

According to Lianos (2007) and Lambrianidis (2011), there is a mismatch between supply and demand of human resources. This misalignment can be attributed to both the insufficient demand of R&D from the private sector and the non-responsiveness of the education system to the market needs. Lambrianidis (2011) argues that the overabundance of highly educated individuals relative to the overall demand is due to the low demand from the private sector for highly qualified personnel.

The demand for researchers is also low compared to the EU-27 average. The share of researchers (in full time equivalents) as a percentage of total employment in Greece was 0.99% at the end of 2012, much lower than the EU-27 average of 1.22%[68]. HEIs and the government employ most of the R&D personnel. BES employs less than 15% of total, compared to a EU-27 average of 44.6%[69] (2011 data).

Most of R&D personnel are employed in the areas of Engineering and Technology (33.6% of total), followed by Social Sciences and Humanities (27.1% of total) and Medical and Health Sciences (20.1% of total)[70]. At the same time, top area in terms of R&D expenditure is Engineering and technology (38.6% of total), followed by Medical and Health Sciences (25.4% of total) and Social Sciences and Humanities (18.5% of total)[71].

The challenge for public policy is to increase the responsiveness of the higher education system to the needs of the economy and to increase the demand from the private sector for highly qualified personnel, as well as the demand for R&D-based knowledge in companies. In March 2014 the Ministry announced a reduction of student posts in HHS by 4% (in addition to 16% last year) to be compensated with a corresponding rise in S&E, which are skills demanded by the market

[67] European Commission, DG for Research and Innovation, Innovation Union Competitiveness report 2011, Country profile – Greece

[68] Eurostat, Total R&D personnel and researchers by sectors of performance, as % of total labour force and total employment, and by sex

[69] Eurostat, Total R&D personnel and researchers by sectors of performance, sex and fields of science

[70] Eurostat 2011 data, Total R&D personnel and researchers by sectors of performance, sex and fields of science

[71] Eurostat 2011 data, Total intramural R&D expenditure (GERD) by sectors of performance and fields of science

Improve the governance of the national innovation system

Although no systematic assessment of the R&D and innovation policy has been implemented so far, apart from some piecemeal efforts from time to time, the evolution of the main R&D and innovation indicators and the gap between targets and achievements[72] reveal low effectiveness and impact.

The lack of efficient monitoring mechanisms and of systematic evaluation has hindered policy learning and does not allow for improvements in the design and implementation of policies. Most striking was the total lack of systematic surveys until 2013, leading to lack of evidence to support effective policy-making.

Despite the urgent need for improvements at all levels of governance, budget cuts and reductions of personnel are disincentives for improvement, while at the same time tensions within the existing organisational structures increase.

The concentration of design and implementation of the R&D policy within a single agent (GSRT) has been repeatedly criticised (Tsipouri and Papadakou, 2005). Furthermore, the positioning of GSRT within the auspices of the Ministry of Education and Religion makes difficult the coordination of innovation policies of other bodies and Ministries.

At the operational level, complex administrative rules, inefficient management structures, and low administrative capacity inhibit the consistency of competitive funding. Grant et al (2011) list several cases where funding decisions were delayed or committed research funds were not paid on time. As a result, competitive funding for the period 2007-2008 was virtually zero (Maroulis, 2011). Absorption increased in 2011-2012 but there is no evidence of significant change in terms of coordination and vision.

Reduce regional disparities in R&D and innovation performance

Greece presents large disparities among its regions both at economic and at R&D level. Unemployment rate is the highest in Western Macedonia (29.9%), followed by Sterea Ellada (27.4%) and Central Macedonia (26%). Ionian Islands (14.1%) have the lowest unemployment[73].

Attica has the highest population with tertiary education (33.1%), followed by Central Macedonia (27.1%) and Northern Greece (24.4%), compared to an average of 26.1% for Greece. Ionian islands have the lowest population with tertiary education (14.7%)[74]. In terms of R&D personnel, Crete and North Aegean come first with 2.2% and 2.09%, respectively of R&D population to total active population. Attica has 1.54% of R&D personnel, slightly above the Greek average of 1.41%, while Ionian Islands have the smallest percentage of R&D personnel to total (0.23%)[75].

In terms of R&D expenditure, Attica has the highest GERD per capita expenditure of €188.4, followed by Crete (€172.9) and Ipeiros (€107.4) compared to a Greek average of €125.1 and the lowest GERD per capital expenditure of € 13.9 recorded in Ionian Islands[76].

Greek regions also experience a variety of innovation patterns; Attica is an innovation follower, Northern Greece, Central Greece, Crete and Aegean islands are modest innovators[77].

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[72] For example, the Lisbon targets

[73] Eurostat, Unemployment rates at the ager group 25064 years old by sex, age and NUTS 2 regions (%)

[74] Eurostat, Persons aged 25-64 with tertiary education attainment, by sex and NUTS 2 regions (from 2000 onwards) - %

[75] Eurostat 2011 data, Total R&D personnel and researchers by sectors of performance, sex and NUTS 2 regions

[76] Eurostat 2011 data, Total intramural R&D expenditure (GERD) by sectors of performance and NUTS 2 regions

In terms of EU funding, Attica and Central Macedonia received the bulk of funding in the period 2007-2013. Limited funding was received by Ionian Islands[78].

3.3. Meeting structural challenges

The five major challenges identified are recognised by the government and are increasingly addressed, with primary focus on competitiveness and entrepreneurship.

Increase business demand for new knowledge

A number of programmes supported by NSRF have been launched, in order to promote entrepreneurship and BERD:

- the programme for "Clothing and Footwear-New Perspectives", addressed to Micro, Small & Medium Enterprises in textiles, clothing, footwear and leather, aims to encourage innovation and entrepreneurship with a total public expenditure of €15m[79];
- the programme "Internationalisation and Competitiveness of Business", launched in February 2011, with a total public expenditure of initially € 30m that is focusing on internationalisation and extroversion of SMEs[80];
- the programme "New-Innovative Entrepreneurship", launched in May 2011, to improve innovation policy design and implementation, for entrepreneurs and SMEs, notably through evaluating and drawing lessons from the EU and past experience and a total public expenditure of € 38.1 m[81]. At the end of December, a total of 443 investment projects of micro and small enterprises would receive funding from this programme, 56.5% of which were seed companies and 43.5% were established companies. The implementation period of these projects was extended to 24 months[82].

As a follow up of the programme "Internationalisation and Competitiveness of Business", the Ministry of Development and Competitiveness launched in October 2013 the programme "Extroversion-Competitiveness II", with a total budget of €30m. A total of 1,143 investment proposals were submitted, with almost twice the initial budget; 575 proposals were submitted by very small (micro) businesses (39.7% of total budget), 371 proposals were submitted by small businesses (37.1% of total budget), 146 proposals were filed by medium sized companies (17.1% of total budget) and 51 proposals were filed by large companies (6.1% of total budget). Attica and Central Macedonia accounted for almost 74% of total budget[83]. The new NSRF (2014-2020) will also support extroversion[84].

The success of these programmes will ultimately depend on the improvement of the macroeconomic climate in Greece and the enhancement of the liquidity of the Greek banking sector which will be called to provide matching funds.

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[77] European Commission, Regional Innovation Scoreboard 2012

[78] Expert evaluation network delivering policy analysis on the performance of Cohesion policy 2007-2013, Year 3 – 2013, Task 2: Country Report on Achievements of Cohesion policy, Greece

[79] Greek National Reforms Programme 2013, April 2013

[80] Greek National Reforms Programme 2013, April 2013

[81] Greek National Reforms Programme 2013, April 2013

[82] http://www.mindev.gov.gr/?p=13202

[83] http://www.mindev.gov.gr/?p=12552

[84] New NSRF, (2014-2020), Priorities and Architecture, Ministry of Development and Competitiveness, December 9th 2013

Ensure better-focused and long term public funding of R&D

In order to ensure better-focused of public funding of R&D, the Greek government considered the findings of studies conducted by McKinsey and the Foundation of Economic and Industrial Research on entrepreneurship, competitiveness and extroversion in Greece and set up the priorities of the new NSRF (2014-2020) in areas where Greece has a comparative advantage, namely Tourism, the Agricultural sector, Logistics, Environmental industry, Health , Energy production and savings, materials, ICT and Creative industries and Culture. McKinsey estimates that a total investment of about €110b in these sectors could have an added value of €48b and create 640,000 new jobs by 2020[85].

A subset of these areas has already received financing from Entrepreneurship Fund established since April 2011, by the Hellenic Fund for Entrepreneurship & Development (ETEAN) to provide funding jointly with banks to entrepreneurs focusing, among others, on thematic tourism, desalination, waste management, green infrastructure, green applications, renewable energy sources, innovative entrepreneurship, supply chain, food and drinks. PAVET 2013 also prioritises funding in areas where Greece has a comparative advantage[86].

The restructuring and consolidation of public research organisations and HEIs that is already underway though the ATHENA plan, is also intended to enhance R&D in focused areas.

Align supply and demand of human resources

The misalignment in skilled employment has widened because of the massive unemployment-affecting graduates, in particular young ones. Research brain drain has increased in the last two years, because of the crisis, and is expected to increase further, as in 2013 the salary reductions in HEIs and PROs were fully implemented.

The ATHENA plan is expected to reduce the misalignment of skills; however, as long as there is no real decentralisation and the Ministry of Education and Religion continues to impose quotas in all departments across the country, improvements are unlikely.

In the programming period 2014-2020, measures are foreseen for the enhancement of mobility of researchers between research centres and universities and the assurance of new recruitments of research staff. A legislative act is announced by GSRT in 2013 to support networking and increased mobility of researchers, as well as R&D public infrastructures and better allocation of resources[87].

The Ministry of Education and Religion is encouraging the introduction entrepreneurship courses in the university curricula, especially in the economics and engineering departments. In addition, offices are established in universities and polytechnics (€101m) that combine career development counselling activities with the promotion of business planning competitions, creation of entrepreneurship clubs, and development of courses on entrepreneurship. Law 4009/11 foresees that these offices will become an official unit within the institutional organogramme. Mobility schemes for student placements are not explicit, as in the past. However, such placements can take place in the context of the different collaboration programmes.

[85] New NSRF, (2014-2020), Priorities and Architecture, Ministry of Development and Competitiveness, December 9th 2013

[86] http://www.mindev.gov.gr/?p=13202

[87] Greek National Reforms Programme, April 2013, Ministry of Finance

In January 2013, GSRT launched a Call for Proposals for the reinforcement of research personnel in enterprises. By June 2013, 63 proposals had been approved, of a total budget of €6.1 m[88].

Improve the governance of the national innovation system

A number of initiatives were undertaken by the government at the end of 2013 to improve the governance of the national innovation system:

- Systematic surveying and publication of RTDI data was organised for the future.
- A public consultation was launched in December 2013 for the new Law on Research, Technology Development and Innovation
- An Innovation Council was established in December 2013, with the joint participation of academics and the industry, as an advisory and coordinating body for the promotion of innovation policy. The Council will recommend innovative measures to the government and will act as a contact point between the businesses and the scientific community and the government[89].

Finally, changes were introduced to the funding mechanism of NSRF in the new programming period (2014-2020)[90].

Evaluation remains a significant weakness: the only evaluation launched in recent years by the GSRT has not been signed yet; after more than a year only one proposal was submitted.

Reduce regional disparities in R&D and innovation performance

The Ministry of Education and Religion has defined Zones of Educational Priority (ZEP) in areas with low total education indicator, high school drop-outs percentages and low university accession percentages, as well as low socioeconomic indicators[91].

Regional Smart Specialisation Strategies for the 13 regions were prepared by a team of international and Greek experts and were released in September 2013, identifying research priorities for each region, taking into account a comprehensive analysis of the regional innovation landscape (SWOT analysis).

In preparation of the new programming period 2014-2020, measures are examined to enhance the demand of research and innovation services by Regional Authorities, as well as to boost the role of the research centers in the regional development[92]. The new NSRF (2014-2020) foresees 13 Regional Operational Programmes and the management of 35% of total funds by Regional Authorities, compared to 22% in the former programming period[93].

[88] Annual Report of GSRT July 2012-June 2013, Ministry of Education, Religion and Sports
[89] http://www.mindev.gov.gr/?p=13184
[90] http://www.mindev.gov.gr/?p=13166
[91] Greek National Reforms Programme, April 2013, Ministry of Finance
[92] Greek National Reforms Programme, April 2013, Ministry of Finance
[93] New NSRF, (2014-2020), Priorities and Architecture, Ministry of Development and Competitiveness, December 9th 2013

Table 3

Challenges	Policy measures/actions addressing the challenge [94]	Assessment in terms of appropriateness, efficiency and effectiveness
1. Increasing business demand for new knowledge	NSRF programmes principally addressed to SMEs: "Clothing and Footwear-New Perspectives" "Internationalisation and Competitiveness of Business" "New-Innovative Entrepreneurship" Focus on extroversion also by the new NSRF (2014-2020)	Funding is unlikely to be sufficient as long as the macro-economic climate is unstable and there is lack of liquidity from Greek banks; there are also worries about the quality of demand for funding.
2. Ensure better-focused and long term public funding on R&D	Restructuring and consolidation of the public research organisations and HEIs Financing in focused R&D areas through the Entrepreneurship Fund and PAVET 2013 Focus of the new NSRF (2014-2020) in areas where Greece has a comparative advantage	Focus on areas where Greece has a comparative advantage will enhance its extroversion and competiveness abroad and it is an efficient way of managing the limited financial resources.
3. Align supply and demand of human resources	Implementation of ATHENA plan Introduction of entrepreneurship courses in the university curricula, especially in the economics and engineering departments Establishment of offices in universities and polytechnics that combine career development counselling activities with the promotion of business planning competitions, creation of entrepreneurship clubs, and development of courses on entrepreneurship Call by GSRT for the reinforcement of research personnel in enterprises	The coordination of labour, education and research policy is still underdeveloped. The decision on the number of students per faculty remains a privilege of the Ministry of Education and Religion there is no streamlining yet.
4. Improve the governance of the national innovation system	Organisation of data gathering Public consultation was launched in December 2013 for the new Law on Research, Technology Development and Innovation Establishment of an Innovation Council in December 2013 Announcement of changes to the funding mechanism of NSRF in the new programming period (2014-2020)	It is too soon to judge the impact that these initiatives will have on the governance of the national innovation system, but they are certainly steps to the right direction.

[94] Changes in the legislation and other initiatives not necessarily related with funding are also included.

5. Reduce regional disparities in R&D and innovation performance	Introduction of Zones of Educational Priorities Preparation of Regional Smart Specialisation Strategies for the 13 regions Increased funding for the regions in the new NSRF (2014-2020) and split into 13 Regional Operational Programmes	The new initiatives aim to decrease regional disparities and enhance their competitiveness in the long run

4. NATIONAL PROGRESS IN INNOVATION UNION KEY POLICY ACTIONS

4.1. Strengthening the knowledge base and reducing fragmentation

Promoting excellence in education and skills development

The national labour market for researchers is small; the share of researchers in full time equivalents as a percentage of total employment in Greece was at 0.64% in 2012, lower than the EU-27 average of 0.76%[95].

Precise national validated statistics on inward/outward mobility of researchers are not available. Inward mobility of Human Resources in Science Technology (HRST) [96] has decreased in the last years from 47,000 people in 2010 to 36,000 people in 2011 and 34,000 people in 2012 (27.6% decrease in the last two years), possibly due to the financial crisis, since inward mobility fluctuated in the region of 46,000-47,000 people in the period 2006-2010[97].

The financial crisis is expected to increase outward mobility of researchers; in 2012, Law 4093 introduced reductions in the salary levels of researchers and scientists employed by local research organisations. The salary reductions and deteriorating career prospects have led researchers to look for short- or even longer-term migration opportunities creating a new brain-drain trend. Precise data are not available but press articles and anecdotal evidence are abundant.

Based on the findings of a study on the condition and mobility of researchers, in 8 Member States including Greece (Austria, Bulgaria, Czech Republic, Cyprus, Greece, Hungary, Slovakia and Switzerland), the main motive for international mobility of researchers in Greece was future career development (81% of respondents), interesting research theme (67% of respondents) and high salaries/high standard of living (56% of respondents). Principal discouraging factor was complex administration of relocation (e.g. formal/legal issues – social and health insurance, employment permit, housing, transportation, etc.), and the lack of support from the home institution (41% of respondents)[98].

On the institutional side, until 2012 inward and outward mobility of researchers was supported by the measure "Support of Postdoctoral Researchers". In November 2012, the Ministry of Education and Religion invited Higher Education Institutions in Greece to respond to a Call for Proposals for participation in the Pilot Programme for the mobility of young researchers of the Mediterranean Office for Youth (MOY); the programme aimed to develop joint higher educational programmes, with the participation of at least two higher educational institutions

[95] Eurostat, Total R&D personnel and researchers by sectors of performance, as % of total labour force and total employment, and by sex

[96] Defined by Eurostat as the number of HRST employed in the years t-1 and t, that have changed jobs during the twelve month period. Employed HRST are those people who have successfully completed a tertiary education and are employed in any kind of job; or are not formally qualified as above but employed in a S&T occupation where the above qualifications are normally required.

[97] Eurostat, Annual data on job-to-job mobility of HRST, employed, 25-64 years old, by sex

[98] Ivacheva L., Gourova E., Challenges for career and mobility of researchers in Europe, Oxford Journal Social Sciences, Science and Public Policy, Vol. 38, Issue 3, pp 185-198
The survey was conducted through questionnaires to researchers (PhD students, Post Docs, experienced researchers, university lecturers, etc) and other stakeholders (representatives of industry, research organizations, NGOs, public bodies, etc.). The sample size was fixed at 100 researchers and 30 stakeholders, with the exception of Cyprus where the sample was much smaller.

from participating countries, at a postgraduate or at doctorate level, and is expected to further enhance transnational mobility[99].

In the programming period 2014-2020, measures are planned for the enhancement of researchers' mobility between research centres and universities and the hiring of new research staff. A legislative act is being drafted by the GSRT to support networking and increased mobility of researchers, as well as R&D public infrastructures and better allocation of resources[100].

The REGPOT programme made possible the hiring of experienced researchers from all over the world, at competitive salaries, and thus resulted to the repatriation of 37 Greek scientists[101].

In January 2013, Law 4115/2013 introduced some provisions for the career of researchers and assistant professors. The same law allowed Professors and Researchers to get transferred to other departments within the same or other Universities, as long as they serve at least 3 years in the same department. Transfers are not allowed towards Universities in Attica or Thessaloniki to avoid undersupply of qualified staff in the periphery.

The Centre of Research and Technology Hellas (CERTH) and University of Crete are the only institutions in Greece, which have expressed their explicit support for the Charter & Code and 102[102].

Research Infrastructures

The deepening of the economic crisis and the severe cuts of public expenditures, which will continue at least until 2014, greatly reduce the ability of the Greek government to mobilise the necessary additional funding to develop the existing public research system. The initiatives currently focus on reforms aiming at increasing the efficiency and effectiveness of the research system and directing the limited funding towards policies that stimulate demand and facilitate the access of innovative enterprises to new markets.

The development of a National ESFRI Strategy is an ex ante conditionality for the securing of funding of local research infrastructure in the next programming period (2014-2020)[103]. In February 2013, GSRT launched a call for the creation of a National Roadmap of Research Infrastructures. The project aims to upgrade the existing RIs to new, large scale infrastructures of national importance, to identify the need for international cooperation in RIs, to identify direct or indirect participation in projects related to ESFRI and to identify research priorities. Expressions of Interest were requested in the following strategic priorities: Food & Agro biotechnology, Energy Technologies & Materials, Environmental technologies, Medical Sciences & Pharmaceuticals, ICT (incl. application in culture, tourism, marine industry, education etc.), Marine Science & Technology, Socio-economic research and Humanities[104].

The first phase of the project was concluded in February 2013, with the submission of 138 proposals (Expressions of Interest), the majority of which was in Physical Sciences and Engineering (31 proposals) and Biological and Medical Sciences (31 proposals), followed by proposals in the field of Environmental Sciences (20 proposals) and proposals in the field of

[99] ERA Communication Fiche Greece, 2012
[100] Greek National Reforms Programme, April 2013, Ministry of Finance
[101] Tzenou G, Malliou N., Sahini E., Academic Excellence in EU Convergence areas 2007-2012: the case of Greece, National Documentation Centre (in Greek)
[102] http://ec.europa.eu/euraxess/index.cfm/rights/strategy4ResearcherOrgs
[103] Annual Report of GSRT July 2012-June 2013, Ministry of Education, Religion and Sports
[104] http://www.gsrt.gr/News/Files/New653/RIS_Roadmap_SupportDoc_2013.pdf

Material Sciences and Analytic Facilities (20 proposals). 14 proposals were submitted in the field of E-infrastructures, 13 in Social Sciences and Humanities received and only 9 proposals were submitted in the Energy field. In May 2013 the GSRT invited interested participants to submit their detailed proposals on the selected research priorities.[105] In December 2013, the Ministry of Education and Religion invited experts to participate in the evaluation of such proposals, with a completion date at the end of January 2014[106].

Greece participates as a partner in several research infrastructure projects of the ESFRI roadmap; DARIAH (DIGITAL INFRASTRUCTURE TO STUDY SOURCE MATERIALS IN CULTURAL HERITAGE INSTITUTIONS), EMSO (MULTISCIPLINARY SEAFLOOR OBSERVATORY), EPOS (INFRASTRUCTURE FOR THE STUDY OF TECTONICS AND EARTH SURFACE DYNAMICS), EURO ARGO (OCEAN OBSERVING BUOY SYSTEM), EU SOLARIS (EUROPEAN SOLAR RESEARCH INFRASTRUCTURE FOR CONCENTRATING SOLAR POWER), BBMRI (BIO-BANKING AND BIOMOLECULAR RESOURCES RESEARCH INFRASTRUCTURE), EMBRC (EUROPEAN MARINE BIOLOGICAL RESOURCE CENTRE), ERINHA (UPGRADE OF THE HIGH SECURITY LABORATORIES FOR THE STUDY OF LEVEL 4 PATHOGENS), Euro Bio-imaging (RESEARCH INFRASTRUCTURE FOR IMAGING TECHNOLOGIES IN BIOLOGICAL AND BIOMEDICAL SCIENCES), Infrafrontier (EUROPEAN INFRASTRUCTURE FOR PHENOTYPING AND ARCHIVING OF MODEL MAMMALIAN GENOMES), ISBE (INFRASTRUCTURE FOR SYSTEMS BIOLOGY – EUROPE), ELI (EXTREME LIGHT INTENSITY SHORT PULSE LASER). BBMRI, EURO-ARGO, and Infrafrontier are expected to become operational in 2015[107].

Greece currently participates in 12 international, research and innovation cooperation projects, either as a partner or as a coordinator (Annex Table 5). The majority of these projects conclude by the end of 2013. Greece coordinates national contact point networks between EU and Central Asian/South Caucasus countries and Gulf countries. The Foundation for Research and Technology Hellas and the General Secretariat of Research and Technology participate in many of these projects either as partner or as coordinator.

4.2. Getting good ideas to market

Improving access to finance

The severe financial crisis of the Greek banking system resulted to amendments in the existing funds and the creation of new funds dedicated to meet the crisis; the budget of the Entrepreneurship Fund was decreased and a New Fund for Business Restarting was created. The budget of Entrepreneurship Fund, established in 2011 by the Hellenic Fund for Entrepreneurship and Development (ETEAN) decreased from €300 million to €133 million, and the financing ratio Fund: Banks was changed to 1:1 for projects in the areas of general and youth entrepreneurship, regional cohesion and clustering, support of business plans for extroversion. The New Fund for Business Restarting will contribute €225 million for the support access of SMEs to working capital, and another €225 million will be contributed by banks.

The Investment Board of Entrepreneurship Fund established the Guarantee Fund with 1:3 leverage ratio, for the provision of guarantees for loans aiming to support new business plans up

[105] http://www.gsrt.gr/News/Files/New707/RI_Roadmap_Guidelines_Phase2_Final(rev1)_2013_05_23.pdf
[106] http://static.diavgeia.gov.gr/doc/ΒΛΓΨ9-ΘΤΙ
[107] European Commission, Assessing the projects on the ESFRI roadmap, A high level expert group report, Research and Innovation

to 10 years, with a grace period between 6 months to 2 years and mature business plans. The Guarantee Fund will receive a €100 million financing from the Entrepreneurship Fund.
The programme of ETEAN for the provision of letters of guarantee issued by the banks in favour of small, very small and micro-enterprises is expected to enhance financing of small and very small SMEs. ETEAN will guarantee a portfolio of letters of guarantee ranging between €10,000-€150,000 per SME.

On March 2012, a new Guarantee Fund for Greek SMEs was created, in order for the European Investment Bank to grant loans up to €1 billion to Greek banks for on-lending to SMEs by the end of 2015[108].

Funding schemes are evaluated in terms of total absorption of available funds and remedy actions are planned, but there is no benchmark comparison with similar schemes in other countries.

Four seed-funds are supported by JEREMIE and invest in ICT start-ups: Odyssey Jeremy Partners Fund € 30 m, Pireaus Jeremie (PJ) Tech Catalyst Fund € 15 m; Openfund II € 10 m and Elikonos Jeremie Fund €17 m.

In the new programming period (2014-2020) the majority of funds will be channelled to competitiveness and entrepreneurship.

Protect and enhance the value of intellectual property and boosting creativity
There is no record of progress targeting intellectual property and encouraging creativity.
In February 2013, Greece signed the international agreement for the establishment of a Unified Patents Court, along with 24 other EU member states[109].

Public procurement
No explicit public procurement for innovation measures have been designed in Greece.

In 2013, a series of Presidential Decrees were issued for the operation and staffing of the Single Public Procurement Authority (SPPA). The e-procurement infrastructure for supplies and services contracts was delivered in January 2013 and, after a testing period became fully operational in November 2013[110].

In the period 2003-2012, Greece recorded below average improvement (less than 20% increase) in e-government compared to EU-27. In the same period, Greece recorded a below average share of new services introduced by public administrations, including the introduction of state-of-the art technologies and their diffusion, but ranked higher than EU27 average (24%) in terms of companies that sold their innovation to the public sector (about 28%).

Internal barriers delay or prevent innovation in public organisations, in line with other Eastern and Southern European countries (Bulgaria, Lithuania, Poland, Romania). Government procurement decisions are usually not fostering technological innovation, according to the perceptions of the business sector (score 3 on a scale of 1-7). However, innovation is considered by pubic organisations more important than low cost, for winning procurement tenders. The

[108] Greek National Reforms Programme 2013, April 2013
[109] http://ec.europa.eu/internal_market/indprop/patent/ratification/index_en.htm#fn1
[110] http://www.promitheus.gov.gr/webcenter/faces/oracle/webcenter/page/scopedMD/sd0cb90ef_26cf_4703_99d5_1561ceff660f/Page119.jspx?_afrLoop=970181479360863 - %40%3F_afrLoop=970181479360863%26_adf.ctrl-state=yl4iwnj16_4

opposite applies to private organisations. In the EPSIS scorecard, Greece ranked above average in innovative services and innovative procurement[111].

4.3. Working in partnership to address societal challenges

Greece participates in European Innovation Partnerships (EIP) on Agricultural Productivity and Sustainability, Active and Healthy Ageing, Raw Materials, Smart Cities and Communities and Water.

In EIP Agricultural Productivity and Sustainability, Greece participates in the High Level Steering Board (Ministry of Agricultural Development). In EIP on Active and Healthy Ageing, Greece participates in total in 44 initiatives, with members such as Unisystems SA, 'Sotiria' Chest Diseases Hospital, Centre for Research and Technology Hellas etc[112]. The Greek Deputy Minister of Environment, Energy and Climate Change participates in the High Level Steering Group (HLSG) and in the SHERPA Group (link between HLSG and Operational Groups) of EIP on Raw Materials[113]. Members of Operational Groups include the National Technical University of Athens (NTUA), the School of Mining and Metallurgical Engineering of NTUA, Greek Geological Survey, S & B Group Environment, Health-Safety, Eurogeosurvey (IGME) and TEI West Macedonia. In EIP Smart Cities and Communities, Greece participates through NTUA. In EIP Water, Greece participates in the working group on Renewable Energy Desalination through CRES (Centre for Renewable Energy Sources & Saving)[114].

4.4. Maximising social and territorial cohesion

National and Regional Smart Specialisation Strategies focus on clusters for regional growth and the support of ICT activities.

It is recommended that cluster mapping is used to identify regional competences and assets and then efforts should be channelled to the support and consulting of existing clusters that will meet the objectives of smart specialisation in different priority areas. Cross clustering could be implemented for identifying innovation opportunities.

In terms of ICT and the digital agenda, it is recommended that specific ICT policy targets are set for each region. PPP models are proposed for leveraging public funding, increasing the involvement of the private sector and mitigating delays. ICT vouchers are proposed to support citizens and SMEs in the standardization of ICT tools, while priority is also given to innovative e-government services, the implementation of e-infrastructures and the design of next-generation-access (NGA) networks, to meet the EU policy targets[115].

[111] European Commission, European Public Sector Innovation Scoreboard, A pilot exercise 2013
[112] https://webgate.ec.europa.eu/eipaha/initiative
[113] http://ec.europa.eu/enterprise/policies/raw-materials/innovation-partnership/structure/index_en.htm
[114] http://ec.europa.eu/environment/water/innovationpartnership/nine_action_groups_en.htm
[115] RIS3 National Assessment: Greece, Smart specialisation as a means to foster economic renewal, A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus, Reid A., Komninos N., Sanchez J., Tsanakas P.

4.5. International Scientific Cooperation

Greece is quite successful in securing funds through competitive European funding programmes. In 2012, the European Commission (including both Structural Funds and the 7th Framework Programme) financed 15.8% (€210.9m) of research expenditure.
Funds from FP7 amount to nearly € 1 billion until 2013, which is close to the amount coming from the Structural Funds; the latter, however, includes research, innovation and entrepreneurship funds classified under the same category and the final figures are not available (commitments are known but not final implementation data). Data on Greek participation in the 7th Framework Programme suggests that overall Greek participants account for 2.85% of all FP participations and 2.44% of European Commission funding for projects. This positive picture is due to the dominant role of ICT related research in the Greek innovation system. Greek participants to the ICT theme of FP7 account for 32% of total funding (€ 230m) awarded to Greek organisations and participation rates were 8% higher than the EU27 average and funding share 13% higher than the EU27 higher. The main Greek strengths are in the areas of ICT for health, for ageing and for inclusion but also in technology areas such as Future networks and internet, Software or embedded systems. In contrast, Greek participation rates in a field like food-agricultural-biotechnology of critical importance to the Greek economy are 2% lower than the EU27 participation share and funding is 1% lower. Again in this field, the top five participants in terms of EC funding and number of participations are all academic institutes and once more attracted half of the total funding received by Greek participants (approximately € 12.5m out of € 25m)[116].

The national R&I framework is affected by the recent financial crisis that has resulted to decreased funding and has lowered the salaries of researchers. Within this context, it is rather difficult to attract top talent from abroad and invest in advanced technology centres.

RTDI cooperation with non-EU member states is facilitated through the INCO ERA-nets of the Western Balkans and Russia, where Greece participates in virtual common pots[117].

The European Research Council (ERC) has invested almost 1% of its budget in frontier research in Greece (€ 37 million), 57.8% out of which in Physical Sciences and Engineering and 42.8% in Life Sciences, while no funding has been received in Social Sciences and Humanities.

Greece ranks low in terms of proposals submitted to the ERC, accounting only for 2.8% of total reviewed applications (720 proposals), 72% of which were addressed to the Starting Grants programme and 28% to the Advanced Grants Programme[118]. The majority of Greek applications (56%) was submitted to the Physical Sciences and engineering domain, followed by Life Sciences (33%) and Social Sciences and Humanities (11%).

The ERC has awarded 24 grants to Greece, 58.3% to starting grants and 41.7% to advanced grants. In the Life Sciences, average Greek grant size is about € 1.4 million for a starting grants

[116] http://www.technopolis-group.com/resources/downloads/reports/RIS3_Greece_National_Assessment_Report_Feb2013.pdf
[117] ERAWATCH, Coutntry Fiche Greece
[118] ERC Starting Grants support top researchers with 2 to 12 years of experience after their PhD and may reach up to €1.5 million or € 2 million in certain circumstances for a period of 5 years. ERC Advanced Grants support established investigators and may reach up to €2.5 million or € 3.5 million in certain circumstances for a period of 5 years.

and € 2.3 million for advanced grants. The majority of ERC grants is concentrated in Athens (13), followed by Crete (5), Patra (3), Thessaloniki (2) and Ioannina (1). Universities or public research organisations implement all grants. The NTUA and the Foundation for Research & Technology Hellas rank first as hosts of ERC grants, followed by the University of Patrai, National Centre for Scientific Research "Demokritos", Biomedical Research Foundation Academy of Athens, National and Kapodistrian University of Athens[119].

Top research collaborations exist with Germany (1,634 links), the UK (1,372 links) and Italy (1,232 links)[120].

[119] Pascuali C., Sahini E., 5 years of Excellence in the European Research Area 2007-2011, the case of Greece, September 2012

[120] European Commission, DG for Research and Innovation, Innovation Union Competitiveness report 2011, Country profile – Greece

5. NATIONAL PROGRESS TOWARDS REALISATION OF ERA

5.1. More effective national research systems

The recent reorganisation of HEIs and TEIs is expected to limit wasted resources and overlaps.

A legislative act is currently being drafted by GSRT to support networking and increased mobility of researchers, as well as R&D public infrastructures and better allocation of resources.

In December 2013, public consultation began for a new law on Research, Technology and Innovation[121].

A new, more simplified administrative management system is foreseen in the period 2014-2020; within this context, GSRT proposes the creation of a single National Multi-Fund Operational Programme on RDI, which will ensure cooperation on RDI issues among different Operational Programmes.

5.2. Optimal transnational co-operation and competition

During the crisis research funding has decreased considerably. Grand challenges are practically only pursued in the context of EU policies.
There are no specific legal provisions or measures for eliminating barriers to the cross-border interoperability of national programmes. Greece has participated in INCO-ERAnets (emphasis on Western Balkans) with virtual common pots but only on an ad hoc basis. Greece has signed a number of R&D bilateral and multilateral agreements with other countries and new cooperation initiatives are expected to be launched in the near future, such as with Israel, China and Germany.
There are no financial commitments for ESFRI yet; the first phase of expressions of interest has been completed and a Roadmap is now under construction. In February 2013, GSRT launched a call for the creation of a National Roadmap of Research Infrastructures. The project aims to upgrade the existing RIs to new, large scale infrastructures of national importance, to identify the need for international cooperation in RIs, to identify direct or indirect participation in projects related to ESFRI and to identify research priorities. Strategic priorities will be assessed in the areas of Food & Agro biotechnology, Energy Technologies & Materials, Environmental technologies, Medical Sciences & Pharmaceuticals, ICT (incl. application in culture, tourism, marine industry, education etc.), Marine Science & Technology, Socio-economic research and Humanities.
There are no significant barriers for cross-border access to RIs. Funding earmarked for research infrastructures has increased and the preparation of the National Infrastructures Roadmap is announced; decisions on the participation in specific ESFRI infrastructures (€35m) are expected in the context of the planning of the new programming period 2014-2020, although Greece is already participating as partner in 12 ESFRI infrastructure projects (DARIAH, EURO ARGO, EMSO, EU SOLARIS etc), including 3 (BBMRI, EURO-ARGO, and Infrafrontier) that will become operational in 2015[122].

[121] http://www.opengov.gr/ypepth/?p=1801
[122] European Commission, Assessing the projects on the ESFRI roadmap, A high level expert group report, Research and Innovation

5.3. An open labour market for researchers

Greece has a high quality research potential with significant brain drain, reinforced by the recent economic crisis. Academic promotion is based on open and competitive procedures and has in 2012 been reorganised to include foreign researchers in the selection panels. Researchers have a right to appeal. While the system is in principle open, knowledge of the Greek language is a hampering factor for inward mobility. In addition salaries are low and have been further reduced;, hence hardly attractive for foreign researchers. Doctoral training has increased significantly, in quantitative terms, in the last decade but in their majority doctoral studies follow traditional training.

In the programming period 2014-2020, measures are foreseen for the enhancement of mobility of researchers between research centres and universities and the assurance of new recruitments of research staff.

There are 12 EURAXESS Services Centres in 8 different cities in Greece, providing useful information to researchers when relocating. The Centre for Research and Technology Hellas, supervised by GSRT is the bridgehead organisation.

There are programmes formally and explicitly following the Principles for Innovative Doctoral Training. There are, however, many PhD programmes that comply (explicitly or implicitly) with some of the seven principles.

13 HEIs, research organizations of the public and private sector have expressed an interest for the HR strategy; the Aristotle University of Thessaloniki, Euroscience, Greek Rectors' Conference, International Hellenic University, the Marie Curie Fellows Association, the National Hellenic Research Foundation, the University of Crete, the University of Ioannina, the University of Patras, the University of Thessaly .The University of Crete and the Centre for Research and Technology Hellas have been acknowledged for their progress in HR Strategy for Researchers and have been awarded HR Excellence in Research logo.

In the framework of the NSRF (2007-2013) specific actions are implemented, aiming to enhance human R&D potential; ARISTEIA (Excellence) I&II, POSTDOCs for the support of post-doctoral researchers, funding of research proposals positively evaluated in Calls of ERC Grants Schemes, Heraclitus II, Archimedes III, Thales. Excellence II supports new researchers to produce high quality research and gain autonomy in their work. The new NSRF will focus on initiatives that will promote social cohesion, the upgrading of the educational system and the enhancement of its links with the business community[123].

5.4. Gender equality and gender mainstreaming in research

While the number of female researchers, in particular in senior positions, is limited, there are no explicit barriers in terms of salaries or other pecuniary benefits.
The National Programme for Gender Equality 2010-2013, adopted in 2010, aimed at creating a legal framework for the provision of equal opportunities to women in the workplace and in life. The programme acknowledged amendments to legislation, while specific project actions have

[123] New NSRF, (2014-2020), Priorities and Architecture, Ministry of Development and Competitiveness, December 9th 2013

been undertaken by the General Secretariat of Gender Equality and interventions in other Ministries and public authorities (gender mainstreaming).

The National Documentation Centre (NDC) participates in GENDERA: Gender Debate in the European Research Area and SHEMERA - Euro-Mediterranean research cooperation on gender and science and has developed a database of good practices for equal opportunities of genders in research (practices related to recruitment, selection and promotion)[124].

5.5. Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

The debate for open access has developed energetically in Greece in the last year with initiatives taken mainly by the NDC. The larger HEIs subscribe to the major scientific journals and faculty members and students have access via the intranet of the institution. E-Journals are circulating but remain marginal compared to traditional journals accessed via the web. In April 2013, there were 18 open access repositories operating in Greece, in 9 Universities and 2 research organisations. 13 of the repositories are IRs, while the remaining five are digital collections either of cultural material and/or past editions of journals.

In June 2012, NDC signed an agreement with the Institute of Scientific and Technology Information Communication of China (ISTIC) for cooperation in the areas of digital content, scientific publications, research electronic infrastructure, bibliometrics, research activity indices and open access to knowledge. The collection of ISTIC includes more than 1 million Phd Thesis, 150,000 conference proceedings, 300,000 e books and a significant number of databases.

In April 2013, the Greek Open Knowledge Foundation Network (OKFN) was created, following an initiative from the Aristotle University of Thessaloniki. The Greek OKFN will focus on open linked data and aims to enhance governance of local research procedures, improve transparency and access to research, cultural and financial data.

[124] Pascuali C., Sahini E., 5 years of Excellence in the European Research Area 2007-2011, the case of Greece, September 2012

ANNEX 1. PERFORMANCE THE NATIONAL AND REGIONAL RESEARCH AND INNOVATION SYSTEM

Feature	Assessment	Latest developments
1. Importance of the research and innovation policy	(-) There is a lack of coordination of R&D activities and public action in relevant policy areas is not implemented in strategic, coherent and integrated way (-) Funding is not focused on specific priorities. Grand challenges (Energy, Health and Environment) accounted for about 8% of GBAORD	(+) In September 2012, a National Committee for Research, Innovation and Technological Development was created (+) Public consultation launched in December 2013 for a new law on RTDI (+) Smart Specialisation strategies in the 13 regions identified priority areas (+) The new NSRF (2014-2020) will focus on areas where Greece has a comparative advantage (Tourism, Agriculture, Logistics, Environmental industry, Health, Energy production and savings, materials, ICT, Creative industries and culture
2. Design and implementation of research and innovation policies	(-) R&I will gain importance in the next programming period	(+) Establishment of an Innovation Coucil in December 2013
3. Innovation policy	(-) There is no active promotion of innovation	(+) Establishment of an Innovation Council in December 2013 (+) The review of the second adjustment programme for Greece provides for the establishment of an Institution for Growth (IfG), which will be dedicated to the support of innovation, and growth of SMEs
4. Intensity and predictability of the public investment in research and innovation	(-) The financial crisis has decreased public funding for education and RTDI (-) The use of tax incentives is only considered for strategic investments	(-) The Innovation Fund created in 2012 did not manage to materialise (+) In December 2013, a new law was voted for the establishment of an Investment Fund by to promote development and innovation of SMEs. (+)The new tax law (voted in December 2013) provides for tax exemptions of R&D expenditure (+) Regional Smart Specialisation Strategies propose a mixture of contracting out of programme management and public-private-partnerships (PPP) for future programmes
5. Excellence as a key criterion for research and education policy	(-)The largest part of R&D public funding is channelled to universities and research centres in the form of block	(+) L.4115/2013 introduced provisions for the professional development of researchers and assistant professors

	grants (-) NSRF is the only channel for competitive funding (-) There is no portability of funds across borders and institutes (-) HEI and public research institutes are constrained by public sector procedures for the recruitment of qualified staff	
6. Education and training systems	(-) There is a shortage of human resources for research	(-) Salary reductions in HEIs and PROs were fully implemented. (+) The Ministry of Education and Religion is encouraging the introduction entrepreneurship courses in the university curricula, especially in the economics and engineering departments (+) Establishment of offices in universities and polytechnics that combine career development counselling activities with the promotion of business planning competitions, (+) In January 2013, GSRT launched a Call for Proposals for the reinforcement of research personnel in enterprises
7. Partnerships between higher education institutes, research centres and businesses, at regional, national and international level	(+) There are clear rules on IP rights (+)There are no obstacles to setting up and operating transnational partnerships and collaborations (+)Greece participates in European Innovation Partnerships (EIP) on Agricultural Productivity and Sustainability, Active and Healthy Ageing, Raw Materials, Smart Cities and Communities and Water	(+) In the programming period 2014-2020, measures are foreseen for the enhancement of mobility of researchers between research centres and universities and the assurance of new recruitments of research staff. (+) A legislative act is being drafted by GSRT in 2013 to support networking and increased mobility of researchers, as well as R&D public infrastructures and better allocation of resources.
8. Framework conditions promote business investment in R&D, entrepreneurship and innovation	(-) Number of filed patent applications is low (-)There is a lack of awareness (and culture) of enterprises for the potential benefits of innovation (+) The rules for starting up and running a business are reported to be simplified. However, there are still complaints in the business world and the Task Force	(+) Establishment of a New Fund for Business Restarting (+) Establishment of a Guarantee Fund

	working on the modernisation of the Greek economy is working towards further improvements. (-) The financial crisis has annulled the venture capital market	
9. Public support to research and innovation in businesses is simple, easy to access, and high quality	(-) Bureaucracy is considered to be very high for the allocation NSRF funding (+) Emphasis is placed on SMEs	(+) The Minister of Development and Competitiveness has announced the establishment of dedicated units within each Ministry for better coordination between the beneficiaries and the Managing Authorities (+) Increased funds in the new programming period for the enhancement of entrepreneurship and competitiveness
10. The public sector itself is a driver of innovation	(-) In the period 2003-2012, Greece recorded below average improvement (less than 20% increase) in e-government compared to EU-27 (-) In the period 2003-2012, Greece recorded a below average share of new services introduced by public administrations, including the introduction of state-of-the art technologies and their diffusion (+) Greece ranked higher than EU-27 average (24%) in terms of companies that sold their innovation to the public sector (about 28%). (-) Internal barriers delay or prevent innovation in public organisations (-) Government procurement decisions are usually not fostering technological innovation (+)In the EPSIS scorecard, Greece ranked above average in innovative services and innovative procurement.	(+) E-platform for tenders became operational in November 2013

ANNEX 2. NATIONAL PROGRESS ON INNOVATION UNION COMMITMENTS

		Main changes	Brief assessment of progress / achievements
1	**Member State Strategies for Researchers' Training and Employment Conditions**	(-) Important salary cuts by L.4093/2012 to researchers employed by research organisations (+) Participation in REGPOT programme (+) Law 4115/2013 introduced provisions for the professional development of researchers and assistant professors and allowed mobility within the same or other Universities	(-) Increase outward mobility (+) Repatriation of 37 Greek scientists (+) Increase supply of researchers in the periphery
4	**ERA Framework**		
5	**Priority European Research Infrastructures**	(+) Launch of call for the creation of a national roadmap of research infrastructures (1st phase concluded and 2nd phase is underway)	(+)The first phase of the project was concluded with the submission of 138 proposals. A draft roadmap is expected to be available by the end of October 2013, with a targeted day for publication at the end of November 2013
7	**SME Involvement**	(+) Enhancement of existing financing schemes targeting SMEs	(+) Enhancement of competitiveness of SMEs
11	**Venture Capital Funds**	-	-
13	**Review of the State Aid Framework**	-	-
14	**EU Patent**	(+) Greece signed the international agreement for the establishment of a Unified Patents Court in February 2013	(+) Creation of a Unified Patent Court
15	**Screening of Regulatory Framework**	-	-
17	**Public Procurement**	(+) Completion of the e-infrastructure which is expected to be operational in Q3 2013 (+) Establishment of a Single Public Procurement Authority	(+) Increase transparency and monitoring (+) Centralisation of all public procurement

20	**Open Access**	-	-
21	**Knowledge Transfer**	(+) Creation of Innovation Clusters "A GREEK PRODUCT, A SINGLE MARKET: THE PLANET" (+) Introduction of PAVET 2013 is being prepared, with an emphasis on R&D on specific thematic priorities like, Agriculture, Food, ICT, Pharmaceuticals, Environment, etc. (+) The programme "New-Innovative Entrepreneurship" entered payments phase in late 2012 and early 2013.	(+) Enhance innovation (+) Encourage collaboration between enterprises and research organizations (+) improve innovation policy and design for entrepreneurs and SMEs and support the commercialisation of new knowledge and ideas.
22	**European Knowledge Market for Patents and Licensing**	-	-
23	**Safeguarding Intellectual Property Rights**	-	-
24	**Structural Funds and Smart Specialisation**	(+) Delivery of Smart Specialisation Strategy reports for 13 regions and Greece	(+) Identification of priority areas by region and analysis of competencies
25	**Post 2013 Structural Fund Programmes**	-	-
26	**European Social Innovation pilot**	-	-
27	**Public Sector Innovation**	-	-
29	**European Innovation Partnerships**	(+) Participation in EIP for Agricultural Productivity and Sustainability, Active and Healthy Ageing, Raw Materials, Smart Cities and Communities and Water	(+) There no are measurable results yet.
30	**Integrated Policies to Attract the Best Researchers**	-	-
31	**Scientific Cooperation with Third Countries**	(+) Greece currently participates in 12 international, research and innovation cooperation projects,	(+) Improve access to foreign research organisations.

		either as a partner or as a coordinator. (+) Greece coordinates national contact point networks between EU and Central Asian/South Caucasus countries and Gulf countries.	(+) Improve access to foreign research organisations
32	**Global Research Infrastructures**	-	-
33	**National Reform Programmes**	(+) Revision of R&D target/GDP by 2020	(+) R&D /GDP set at 0.6% of GDP by 2020

ANNEX 3. NATIONAL PROGRESS TOWARDS REALISATION OF ERA

ERA Priority	ERA Action	Recent changes	Assessment of progress in delivering ERA
1. More effective national research systems	Action 1: Introduce or enhance competitive funding through calls for proposals and institutional assessments	A new RDI law is under way (consultation finished at the end of 2013), which is expected to introduce changes to institutional evaluations.	(+) Competitive funding is increasing as a share of total funding and international peer review is increasingly adopted (-) Institutional assessment experiences significant delays
	Action 2: Ensure that all public bodies responsible for allocating research funds apply the core principles of international peer review	100% of the all research funding institutions in the country must apply the core principles of peer review; the GSRT has adopted international peer review for a number of calls	(+) Law has introduced peer review by international experts, however implementation is slow (-) Peer review is used more for research than for innovation-related calls
2. Optimal transnational co-operation and competition	Action 1: Step up efforts to implement joint research agendas addressing grand challenges, sharing information about activities in agreed priority areas, ensuring that adequate national funding is committed and strategically aligned at European level in these areas		(-)There is no adequate national funding, because of the austerity measures introduced during the crisis (+) Specific actions take the form of common priorities in bilateral research agreements
	Action 2: Ensure mutual recognition of evaluations that conform to international peer-review standards as a basis for national funding decisions		(-) Funding is not linked to performance
	Action 3: Remove legal and other barriers to the cross-border interoperability of national programmes to permit joint financing of actions including cooperation with non-EU countries where relevant		(+) There are no barriers. (-) Although there are no legal barriers administrative dealays make cooperation very difficult
	Action 4: Confirm financial commitments for the construction and operation of ESFRI, global, national and regional RIs of pan-European interest,	In February 2013, GSRT launched a call for the creation of a National Roadmap of Research Infrastructures and the process is expected to be concluded in the first	(-) Financial commitments are yet to be finalised

	particularly when developing national roadmaps and the next SF programmes	quarter of 2014..	
	Action 5: Remove legal and other barriers to cross-border access to RIs		(+) There are no barriers.
ERA priority 3: An open labour market for researchers	Action 1: Remove legal and other barriers to the application of open, transparent and merit based recruitment of researchers	Law 4115/2013 (art.34) introduced provisions for the professional development of researchers. In the programming period 2014-2020, measures are foreseen for the enhancement of mobility of researchers between research centres and universities and the assurance of new recruitments of research staff.	(+) Measures have been taken for the recruitment and professional development of researchers but improvements need to be made for the enhancement of their mobility
	Action 2: Remove legal and other barriers which hamper cross-border access to and portability of national grants		(-)Publicly funded grants or fellowships are not portable to other EU countries.
	Action 3: Support implementation of the Declaration of Commitment to provide coordinated personalised information and services to researchers through the pan-European EURAXESS3 network	There are 13 EURAXESS Services Centres in 8 different cities in Greece	(-) More jobs need to be advertised through the network
	Action 4: Support the setting up and running of structured innovative doctoral training programmes applying the Principles for Innovative Doctoral Training.		(-) There are no programmes applying these principles (+) although there are no formal programmes the more prestigious HEIs adopt most of the principles informally
	Action 5: Create an enabling framework for the implementation of the HR Strategy for Researchers incorporating the Charter & Code		(+)14 HEIs, research organisations of the public and private sector have endorsed the Chartered and Code
ERA priority 4: Gender equality and gender mainstreaming in research	Action 1: Create a legal and policy environment and provide incentives		(-) There are no barriers for female researchers but no specific measures are introduced to enhance their participation. Equality is based on the overall gender policy in the country.
	Action 2: Engage in partnerships with funding agencies, research organisations and	The National Documentation centre participates in GENDERA	(-) Partnerships need to be enhanced.

	universities to foster cultural and institutional change on gender		
	Action 3: Ensure that at least 40% of the under-represented sex participate in committees involved in recruitment/career progression and in establishing and evaluating		(-)There are no provisions in that respect.
ERA priority 5: Optimal circulation, access to and transfer of scientific knowledge including via digital ERA	Action 1: Define and coordinate their policies on access to and preservation of scientific information		(-)There are no specific OA actions for SMEs (+) Initiatives are undertaken by the National Documentation Centre (NDC), the pioneering institution in Greece for the promotion of Open Access policies with a PhD repository, cultural content and Greek scientific publications. (+)The national research strategy of the new programming period will take new initiatives for open access, in the context of the digital agenda.
	Action 2: Ensure that public research contributes to Open Innovation and foster knowledge transfer between public and private sectors through national knowledge transfer strategies	The Hellenic Mobile Cluster Programme, laws introduced in April 2013, in order to boost competitiveness, entrepreneurship and innovation. R&D investments in the private sector are supported by the Operational Programme for Research and Innovation in the new programming period 2014-2020.	(+) Intermediaries and clusters are supported by the state through ERDF funding to ensure technology transfer services (+) NDC supports the development of research collaborations and exploitation of results between the public and private sectors. NDC coordinates the Enterprise Europe Network-Hella and other transnational projects (-) Despite increasing financial support a large part of the business sector remains reluctant to invest in new technologies
	Action 3: Harmonise access and usage policies for research and education-related public e-infrastructures and for associated digital research services enabling consortia of different types of public and private partners	There are calls and initiatives in the context of the Operational Programme "Diginat Convergence" btu their implementation is slow	(+) Computing and Cloud Services are facilitated by the Greek Research and Technology Network (GRNET) (+) Electronic means are increasingly used in schools

	Action 4: Adopt and implement national strategies for electronic identity for researchers giving them transnational access to digital research services		(-) There is no national policy on e-identity. (+) Greece participates in eduGain, a group of institutions and organisations using Authentication and Authorisation Infrastructures (AAIs) to build a trusted environment where users can be identified electronically using a single identity

ANNEX 4 GBAORD SHARE ALLOCATED FOR SPECIFIC PRIORITIES (€ MILLION)

	2011	2012
Exploration and exploitation of the earth	24.8	25.1
Environment	5.6	7
Exploration and exploitation of space	16.2	10
Transport, telecommunication and other infrastructures	22.9	12.9
Energy	20.8	24.7
Industrial Prodiction and Technology	14.4	26.3
Health	20.5	16.8
Agriculture	31.4	28.6
Education	4.5	4.6
Culture, recreation, religion and mass media	**96.6**	**104**
Political and social systems, structures and processes	4.9	5.1
General advancement of knowledge: R&D financed from General University Funds (GUF)	**247.4**	**238.7**
General advancement of knowledge: R&D financed from other sources than GUF	**57.1**	**73.3**
Defence	5.69	4.3
Total civil R&D appropriations	**572.79**	**581.4**

Source: Eurostat, Total GBAORD by NABS 2007 socio-economic objectives

ANNEX 5: GREEK PARTICIPATION IN INTERNATIONAL PROJECTS

no.	PROJECT	DESCRIPTION	COST (€)	FUNDING (€)	PARTICIPATION	START	DURATION (months)	PARTNERS	LINK
1	INCONTACT-oneworld	Establishment of a strong network of national contact points for issues related to FP7	2.330.000	2.000.000	Foundation for Research and Technology Hellas (Coordinator)	01.01.2010	48	12 partners from China, Egypt, Italy, Germany, France, Norway, Sweden, Estonia, Mexico, South Africa, Russia, Thailand	http://www.ncp-incontact.eu
2	IncoNET CA/SC	Enhancement of S&T bi-regional EU–Central Asian/South Caucasus cooperation	1.860.000	1.599.860	International Centre for Black Sea Studies (Coordinator), Foundation for Research and Technology Hellas, General Secretariat for Research	01.04.2010	36	26 partners from Germany (2), Turkey, Kazakstan (3), Estonia, Georgia, Uzbekistan, Turkmenistan, Greece (2), Armenia (2), Azerbaijan (3), France, Kyrgyzstan (3), Tajikistan, Turkmenistan, Georgia (2), Uzbekistan	http://www.inco-casc.net/

					and Technology				
3	IncoNET GCC	S&T cooperation network for Gulf countries	2.650.000	1.966.931	Euroconsultants SA (Coordinator), Foundation for Research and Technology Hellas	01.01.2010	36	17 partners from Greece, UK, Italy, Spain, Sweden, France, Oman (2), UAE, Bahrain, Kuwait, Saudi Arabia (2), Qatar, Yemen, Egypt, Morocco	
4	INDIA GATE	Increase S&T cooperation between India and the EU, through the creation of a one-stop-shop for funding opportunities for EU organisations in India	629.880	499.817	Foundation for Research and Technology Hellas	01.01.2010	36	6 from Hungary, Belgium, India (3) and Greece	http://www.access4.eu/india

5	SENS-ERA	Strengthening of research links between Georgian Technical University and European Research and innovation organisations	522.540	466.907	Technological Education Institute of Pireaus	01.01.2011	24	3 from UK (2) and Greece	n/a
6	ERA.Net RUS	Increasing S&T cooperation and coordination between Russia and EU research organisations	3.078.000	2.597.000	General Secretariat of Research and Technology	01.02.2009	48	16 partners from Hungary, France (3), Belgium, Turkey, Finland, Austria, Germany, Norway, Estonia, Greece and Russia (4)	http://www.eranet-rus.eu
7	Nanotwinning	Enhancement of collaboration in nanotechnology through the twinning of the Institute of Physics of the National Academy of Science of Ukraine with EU institutions	554.211	498.696	European Profiles SA	01.12.2011	28	4 partners from Greece, Estonia,Italy, France	n/a

8	START	Increase EU-Ukraine cooperation in the field of superhard materials	554.730	499.945	International Environment and Quality Services North Greece Ltd	01.11.2011	30	3 partners from France, Poland and Greece	n/a
9	JoRIEW	Enhancement of Jordanian research activity in renewable energy and water supply through networking with EU research centres, the development of training modules and the formulation of Jordanian research strategy	602.479	499.233	University of Western Macedonia, Centre for Research and Technology Hellas	01.11.2010	36	6 partners from Serbia, Croatia, Greece (2), Hungary and Denmark	http://www.joriew.eu
10	JEWEL	Stimulate cooperation between Jordan and EU in ICT	591.910	498.632	Aristoteleio Panepistimio Thessalonikii	01.11.2010	36	2 partners from Greece and France	n/a

11	MIRA	Mediterranean Coordination and Research Innovation Action for the support of S&T dialogue between EU and Mediterranean Partner Countries	4.920.000	3.990.000	National Hellenic Research Foundation Greece	01.01.2008	60	30 partners from Spain (3), Morocco (2), France (2), Tunisia, Egypt (2), Germany (2), Turkey (2), Malta, Jordan, Italy (2), Algeria (2), Lebanon (2), Cyprus, Portugal, UK, Montenegro, Herzegovina, Directorate General of Development & Scientific Research, Occupied Palestinian Territories, Greece, Israel	http://www.miraproject.eu
12	WBC-INCO.NET	Coordination of research policies with the Western Balkan countries	3.400.000	3.050.000	General Secretariat of Research and Technology, South-East European Research Centre	01.01.2008	72	28 partners from Albania (3), Croatia (2), FYROM (2), Serbia (2), Herzegovina (2), Montenegro (2), Austria (2), Kosovo, Belgium (2), Bulgaria, Gemany (2), Greece (2), Italy, Netherlands, Slovenia, Spain, Turkey	http://www.wbc-inco.net

Source: European Commission, DG for Research and Innovation, Projects in support of international research and innovation cooperation, International cooperation activities of the FP7 Capacities programme, 2012

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LIST OF ABBREVIATIONS

BERD	Business Expenditures for Research and Development
BES	Business Enterprise Sector
CERN	European Organisation for Nuclear Research
ERA	European Research Area
COST	European Cooperation in Science and Technology
ERA-NET	European Research Area Network
ERP Fund	European Recovery Programme Fund
ESA	European Space Agency
ESFRI	European Strategy Forum on Research Infrastructures
ETEAN	Hellenic Fund for Entrepreneurship & Development
FP	European Framework Programme for Research and Technology Development
ERC	European Research Council
EU	European Union
EU-27	European Union including 27 Member States
FDI	Foreign Direct Investments
FP	Framework Programme
FP7	7th Framework Programme
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
GSRT	General Secretariat of Research and Technology
GUF	General University Funds
HEI	Higher education institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
HQA	Hellenic Quality Assurance and Accreditation Agency
IfG	Institution for Growth
IP	Intellectual Property
NARIC	National Academic Recognition and Information Centre
NCRT	National Council for Research and Technology
NDC	National Documentation Centre
NSRF	National Strategic Reference Framework
OECD	Organisation for Economic Co-operation and Development
PRO	Public Research Organisations
PSCTA	Permanent Special Committee on Technology Assessment
R&D	Research and development
REGPOT	Research Potential for Convergence Regions
RI	Research Infrastructures
RTDI	Research Technological Development and Innovation
SDP	Strategic Development Plan for Research Technology and Innovation
SF	Structural Funds
SME	Small and Medium Sized Enterprise
S&T	Science and technology
VC	Venture Capital

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